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MUNICIPAL CALCUTTA
ITS INSTITUTIONS IN THEIR ORIGIN
AND GROWTH

MUNICIPAL CALCUTTA :)

ITS INSTITUTIONS IN THEIR (ORIGIN AND GROWTH)

COMPILED BY

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INDIAN CIVIL SERVICE, AND

LATE DEPUTY-CHAIRMAN, CALCUTTA CORPORATION



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P R E F A C E .

THE compilation of a Municipal Gazetteer of Calcutta seems first to have been contemplated by the late Sir Charles Allen, Chairman of the Calcutta Corporation from 1905 to 1909. A rough table of contents was outlined by him, and a few sections dealing with some minor and comparatively modern municipal institutions, such as the Record Room and the incineration of refuse, were actually prepared. It soon however became evident that a historical and statistical account of the rise and growth of municipal government in Calcutta, involving a laborious examination of the voluminous records of the Corporation, could not be compiled in the leisure hours of its officers, and the work was perforce shelved for several years. In 1910 the Corporation decided on a revaluation of its Block, and Mr. S. C. Roy, M.A., Travelling Auditor to the Municipality, was placed on special duty with a small staff to ascertain the actual capital expenditure of the Corporation for the last half century by an examination of its records and accounts. In the course of his inquiries Mr. Roy collected valuable materials not directly pertaining to Block, which he suggested might form the basis of the proposed gazetteer. His period of deputation was extended from August 1911 to June 1912, and during this time he prepared a rough draft of the proposed work, and had elaborate though frequently incomplete statistics prepared from the materials used in his valuation of Block.

• In 1914, when I was proceeding on leave to England, I was asked by the Corporation to undertake the task

of completing the gazetteer. Mr. Roy's work was made over to me, and I obtained from the Municipal Record Room, along with such original records as could be conveniently carried, copies of the more important reports—such as those by the Fever Hospital Committee of 1837, the administration reports of the Improvement Commissioners, the discussions on the Municipal Bills of 1863 and afterwards, the report of the Sanitary Commission of 1884 and the Building Commission of 1897, the reports and discussions on the various drainage and water-supply projects, etc.—which have had important bearing on the policy and expansion of the Municipality since its earliest beginnings. I examined also before leaving Calcutta the extant volumes of the reports of the Lottery Commissioners (1817-36), but was unwilling to accept the responsibility of bringing these valuable records home. The study of these original documents has been a work of considerable labour, augmented in no small degree by the doubt arising from countless and inevitable lacunæ, which only the Central Records Department could have made good. For filling in the details on the broad outlines which these authorities gave me, I have been constantly indebted to Mr. Roy's work: without his valuable researches into the Corporation archives, this gazetteer, imperfect and fragmentary as in many places I know it to be, could not have been written. I am also much indebted to Mr. J. Ball Hill, A.M.I.C.E., Executive Engineer, Calcutta Corporation, and to Mr. A. Peirce, A.M.I.C.E., Water Engineer, for kindly placing at my disposal their valuable articles on the drainage and water-supply systems of Calcutta; in describing these systems in Chapters III. and V. I have followed their accounts closely, often indeed *verbatim*, without special acknowledgment. I have also to thank Mr. B. V. Ramiah, Secretary's Department, for a careful note

upon the early history of the Police (Pauper) Hospital, out of which the Campbell Hospital grew.

I am conscious of many defects—both omissions and in the method of treatment—which could often have been easily rectified by access to other records or to the heads of the municipal departments. In particular I have found it impracticable with the materials at hand to compile the elaborate statistical appendices which were contemplated by Sir Charles Allen ; figures, however, which it is hoped sufficiently illustrate the striking development of the Calcutta Municipality have been incorporated in the text. It is in any case a matter of some satisfaction to have at length launched a work which has so long been on the stocks, and it is believed that the revision of the gazetteer some years hence, whether its amplification, rearrangement, or the addition of statistical appendices, will be, compared with the original task, a matter of little difficulty.

As regards the method of treatment, it has seemed advisable to adopt the historical standpoint and to emphasise the growth or evolution of our institutions and offices ; and if it is thought that the labours and the problems of the earliest municipal executive have been described with too great diffuseness, I would reply firstly that the beginnings of our municipal government cannot be a matter of indifference to those who now guide its fortunes (for whose use alone this book is primarily intended), and secondly that, so far as I know, there is no work at present which gives any connected account of the changes in the municipal constitution during the last century.

S. W. GOODE.

EDINBURGH, 15th February 1916.

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(December 1915) *Frontispiece*

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Formerly known as the Great Tank, *see* p. 346.

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Built (1797-1804) at the instance of the Marquis of Wellesley, who held that 'India should be governed from a palace, not from a counting-house.' The design (by Captain Wyatt, R.E.) followed to some extent that of Kedleston Hall, in Derbyshire, Lord Curzon's ancestral seat. Building cost 13 lakhs of rupees, the site Rs80,000, and the furniture half a lakh (*Ray's Short History*, p. 99).

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CHAPTER I

INTRODUCTORY

Foundation of Calcutta.—It was not mere chance, nor even the pressure of events, which most strongly influenced Job Charnock, 'favourite servant of the Company,' when on the 24th August 1690 he moored his boats off Sutanuti, on the east bank of the Hughli. An old writer suggests that it was the famous Baitha-Khana tree, 'whose shade captivated the Venerable Charnock,' and his contemporaries frequently assumed that a more unsuitable site for a great city could not have been found. Modern opinion, however, and history itself have amply vindicated the judgment and foresight of the shrewd old factor. It will not be out of place briefly to sketch the events and circumstances which guided Charnock to the malarious swamp, on which a great metropolis has since grown up.

In 1633 the English, already securely established on the Coromandel Coast, began to explore the new field which Bengal offered to their trade.¹

A party of eight Englishmen set sail in a country boat from Masulipatam and pushed up the coast of Orissa to Harispur, and so a short distance up the river Patna. A journey overland brought them to Cuttack, and here they had audience of the Moghul Viceroy. Mr. Ralph Cartwright, merchant and leader of the deputation, impressed the Governor by his firm and independent attitude in the negotiations which ensued, and won his consent to the foundation of a factory, with free trade in his dominions, at Hariharapur (Harispur), some twenty-five miles from Cuttack. Cartwright himself shortly

¹ For this account of the foundation of Calcutta, I am chiefly indebted to Wilson's fascinating *Early Annals of the English in Bengal*.

afterwards proceeded to Balasore, to establish there a second depot. From these small beginnings, and in spite of many discouragements and reverses, the Company's trade in Bengal soon expanded to considerable dimensions. For this expansion the merchant adventurers often paid dearly. We see them harassed and vexed by the petty tyranny and the ever-increasing exactions of the Moghul officials, yet prepared to stomach insults and suffer endless losses and inconvenience, if nevertheless their trade might grow and thrive, and win them the grudging thanks of their worshipful masters. Fifty years pass, and we see the idea, already seized with conviction by such men as Winter, Hedges, and Charnock, coming gradually to obsess the cautious minds of the Company, that submission to arbitrary and capricious demands could lead to no lasting settlement, and that in India 'force and a strong fortification were better than an ambassador.' The policy of obtaining a fortified settlement—if it could be made secure without prematurely arousing the resentful suspicion of the Moghul—became more and more attractive in the eyes of the Company, and soon gave way to even bolder plans: when Charnock at last became Agent at the town of Hughli, he was authorised to break with the Moghul and establish himself at all costs within fortifications.

The fighting at Hughli and Hidjli followed in 1686-87; the English at least held their own, and the indecisive operations at Hidjli ended in Charnock's retiring for the monsoon to Sutanuti. The ill-advised scheme of his masters for the seizure of the Chittagong, and the amazingly futile operations of Captain Heath of the *Defence*, who had been sent out in 1688 with a strong fleet to take supreme charge of the Company's affairs in Bengal, ended in a success which they were far from deserving. When disaster stared them in the face, the aged Aurungzebe began to regret the loss of trade which the expulsion of the insolent traders must involve; his anger cooled, and he issued orders forgiving 'their irregular past proceedings,' and permitting them to resume their trade as before. Charnock after some hesitation accepted his

overtures, and in 1690 returned—on his third visit—to Sutanuti, the strategic and commercial advantages of which he clearly recognised.

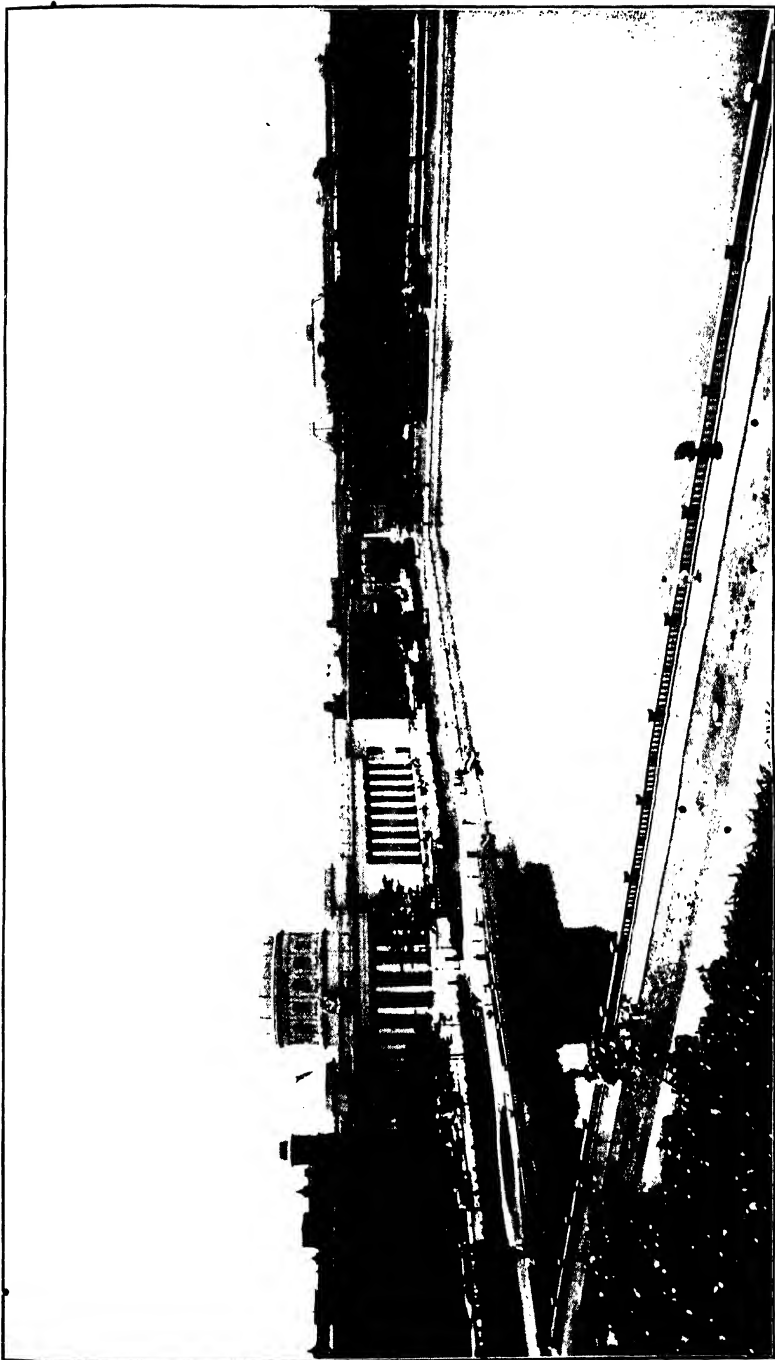
This time he had come to stay, and history has recognised his title to the proud honour of founding British Calcutta. On its site he found a cluster of tiny riverside villages—Calcutta, Sutanuti, Govindpur, Salkhia, Chitpur, and the ancient shrine at Kalighat. Legend has been busy with the origins of these early settlements, and literary reference to Calcutta and Kalighat is found as early as 1495 A.D., in a poem written by the Bengali, Bipradas.

With the advent of the Portuguese at the beginning of the sixteenth century, the light of history falls across the Hughli. At Betor, by the site of the modern Sibpur, the foreigners carried on a brisk trade, while five Bengali families (four Byzacks and one family of Setts) broke, as their family archives show, new ground on the east bank of the Hughli, with the settlement of Govindpur, south of the modern Chowringhee. These settlers in the course of time came into contact with the English merchants, whose ships often found anchorage at Garden Reach; and when Charnock was directed to discover a favourable site for the fortified settlement, which at last became essential to the security of the Company's trade, his mind turned naturally to Sutanuti, the little village north of Govindpur.

Calcutta, the hamlet which lay between Govindpur and Sutanuti, provided the site for old Fort William, and has given its name to the city, whose future greatness even Charnock's sagacity could not have foreseen. The countryside had not yet been closely settled, and the Company, when it returned on the Emperor's invitation, seems to have assumed possession of such land as it required. It seemed advisable to strengthen their *de facto* right by the acquisition of title-deeds, and for a consideration the local authorities were complaisant enough. In 1698 Prince Azim-us-Shan, Governor of Bengal, gave letters patent to the Company, authorising them to purchase from the existing holders the right of renting the three villages of Sutanuti, Dihi Calcutta, and

Govindpur. Under this authority, the English purchased the zemindaries of these three mauzas for the sum of thirteen hundred rupees. The Company thereby became the zemindar of these estates, and, subject to the payment of an annual rent of twelve hundred rupees to the Moghul, it was free to tax and administer its territory almost as it chose.

Area and Boundaries of Calcutta.—The territory over which the Company assumed control was about 5077 bighas, or 1692 acres in area, comprising roughly the land between the river and the Salt Lakes, from Govindpur to Sutanuti. These limits of course included a much larger area than 5077 bighas : we find that even in 1752 some lands ‘within the Company’s bounds,’ viz., the districts of Simla, Mallanga, Mirzapore, and Hogulkuria, were still held by private proprietors, who could not be induced to alienate their rights to the Company. The Company’s territory was, for purposes of administration, split up into four divisions. The largest was Dihi Calcutta, the central division, in which the old Fort and the Company’s offices were built. It centred round the Great Tank (Dalhousie Square), and included what is now known as the ‘business quarter’ of Calcutta. In 1706 only 248 bighas out of 1718 bighas in this division were built over. At the same period, about 134 bighas out of a total area of 1693 bighas were occupied with dwellings in Sutanuti, the northern division; while in the southern division (Govindpur), corresponding to the modern Fort William and the Maidan, some 57 bighas out of 1178 had been occupied. In Barabazaar no less than 400 bighas out of 488 had been built over; the congestion of this area is no modern phenomenon. Thus about 840 bighas out of the 5077 bighas granted in 1698 by Prince Azim-us-Shan’s sanad, had been utilised for building purposes some eight years later. At this time old Fort William, with its picturesque crimson walls, was the central and dominant feature of the landscape. In front to the east was the Great Tank, and on the north-west corner of the site, where Writers’ Buildings now stand, rose the lofty spire of St. Anne’s Church.



Palace of Bourn, 25, St. Peter's, California

Here lay the nucleus of the English town, and round the famous tank clustered the houses of the Company's servants. From the sacred shrine of Kali, Broad Street (now Bentinck Street), 'the immemorial pilgrim road,' stretched away towards the north of the town, where the Indian population had already begun to gather. Many years later the excavation of the Mahratta Ditch gave a famous landmark to the growing town.

'In 1742 the township of Calcutta was limited and defined by a ditch, begun as a protection against the Mahrattas, commencing about three miles to the north of the Fort, where a deep muddy river debouched into the river. It was meant to surround the town and fall again into the river about the same distance below the Fort, but was never completed.'¹ The influx of population from the western bank of the Hughli, which the Mahratta scare produced, led to an extensive clearance of the jungle which surrounded the small area already settled and occupied. It was not until the treaty of 1757 that the Company obtained possession of all lands within the Ditch, but for many years the acquisition of zemindari by the Company within this limit went steadily on, and these new areas were rapidly cleared and occupied. The 'town' thus gradually expanded to include the suburban area, which lay outside it, though inside the Mahratta Ditch. Thus it was that the mauzas Hogulkuria, Simlā, Tuntuneah, Arcooly, Mirzapore, Mallanga, Dingabhanga, Colinga, Taltola, Birjee, and Ooltadinga became a part of the 'town.'

Beyond the Ditch were the suburbs, the boundaries and organisation of which underwent many changes. When the reconstruction of the town began after its recapture in 1757, it was expected to expand at no distant date beyond its old limits, and the Company therefore, according to Holwell, 'annexed a considerable tract of land taken from the 24 Parganas adjoining to Calcutta, in order to extend its bounds.'

This tract of land, added to some other mauzas, designed for the extension of the town but lying outside

¹ *Fever Hospital Committee's Report*, App. D, p. 136.

the Ditch, made up 15 dihis or homestead lands, comprising 55 mauzas or grâms; it was therefore called 'Panchannagram.'

The term 'suburbs' was used to designate the land lying within the general limits of 'Panchannagram.' This division of town and suburbs, which were treated as two separate municipal towns in 1857, remained extant with certain modifications until 1888.¹

The boundaries of Calcutta in the year 1779 are clearly defined in a judgment of Mr. Justice Hyde, dated 10th September of that year. He makes the following statements² :—

'Kidderpore is a village about two miles from the Court House, lying close to a small river commonly called by the English, Kidderpore Nulla. This river is the boundary southward of the town of Calcutta, of which the river, commonly called the Hooghly River, is the boundary north-westward, and the Mahratta Ditch, which exists in many parts and the line where it once was, in other places, are the boundaries north-eastward, eastward, and south-eastward, to the place where that ditch or line, where it existed, meets the Kidderpore Nulla, and from that place, the rivulet is the boundary. This rivulet was a little to the westward of the new Fort, which is considered as within the town of Calcutta, and I consider Fort William to be the English name of the town. Calcutta is the Bengali name of one of many villages, of which the town of Calcutta consists.'

These boundaries appear to have undergone no change during the next sixty years, for Section 3 of Act XXIV. of 1840 gives the following boundaries :—north, Mahratta Ditch; east, Circular Road (which was constructed along the eastern portion of the Ditch); west, the Hughli; and south, Lower Circular Road to Kidderpore Bridge and Tolly's Nullah to the river, including the Fort and Cooly Bazaar (Hastings). Act XVI. of 1847 excluded Fort William (and the Esplanade) and Hastings from the town, the southern boundary now becoming Lower Circular

¹ *Vide Ray's Short History of Calcutta*, p. 53.

² *Vide Bengal Past and Present*, vol. iii. p. 37.

Road, and the south-western boundary Chowringhee Road. Hastings was, however, again included within the town limits by Act V. of 1868. It had originally been inhabited by the coolies employed at the Fort, and was at this time managed by the Commissioner of Police, but it gradually grew into a small suburb of sufficient importance to require a regular municipal administration.¹ The town limits remained unchanged until 1889. Under Act IV. of 1876, the Municipality of the Suburbs was defined by a government notification, dated 10th September 1877; certain mauzas in the Panchannagram list were excluded, while several villages taken from the 24 Parganas were included. The town at this time consisted of 18 wards, with an area of 3754 acres.

In 1889 extensive changes were made in the boundaries both of the town and the suburbs. The Suburban Municipality was split up so as to form, (1) the North Suburban Municipality of Cossipore-Chitpore, (2) the East Suburban Municipality of Manicktollah, (3) the Suburban Municipality of Garden Reach, and (4) the South Suburban Municipality of Tollygunge. To form Nos. (3) and (4), some parts of the 24 Parganas were added, while those mauzas of Panchannagram, included in the old Suburban Municipality of 1876, but forming no part of the four new municipalities, viz., those mauzas belonging to Thanag-Entally, Beniapukker, Ballygunge, Tollygunge, and Bhowanipore, were added to the town. The area bounded on the east by the Circular Canal and on the west by Circular Road was added to the town to comprise its Fringe Area Wards, while the remaining mauzas were absorbed to form the Added Area Wards. The town was divided into 25 wards with a total area of 11,954 acres, or about 19 square miles.²

Its present boundaries are as follows :—

North and East : Circular Canal, Pagladanga Road,
South Tangra, and Topsia Roads, E.B.S.,
Railway line.

¹ As a contribution to the cost of administration, Government made over the ground rents of Hastings to the Municipality.

² *Vide Ray, Short History*, pp. 54 and 55.

South : E.B.S. Railway line, Russa Road, Tollygunge Circular Road, Shahpur Road, Goragatchia Road, up to Nimakmehal Ghât.

West : Hughli River.

EVOLUTION OF MUNICIPAL GOVERNMENT

Local government in Calcutta owes its comparatively rapid progress largely to the liberal and sympathetic policy of the early Governors of India. To the generation that has passed, it no doubt often seemed that the stout little barque of popular government was battling on through storms and gales, mysteriously brewed by the Powers that Be ; absorbed in the struggle, they forgot that in any case it was Government which launched the tiny craft, and not with maledictions but with large words of comfort and hope. As the popular voice grew more articulate, it was natural that it should be raised more vehemently against the anomalies and compromises which might still fret and hamper the popular will ; but it is due to them who toiled before in the same fields, to remember that concessions and privileges were not wrung from the grudging hands of those in power, but that, on the contrary, municipal autonomy was constantly thrust upon an indolent and careless public. It was early in the last century that the problems of sanitation began to attract some attention in Calcutta. People lived (or more frequently died) under conditions which might shock even the blunted senses of the dwellers in an 'unimproved' bustee, while the Collector of Calcutta, with an inadequate staff and scanty funds, made puny, if heroic, efforts to cleanse the Augean stables. With the dawn of the nineteenth century came Lord Wellesley's grave and weighty Minute, and from thence onwards the problem of interesting Calcutta in its civic administration became the constant anxiety of Government.

Early Administration.—The municipal administration of the town (if such a conception can be accurately applied to the early days of Calcutta) was originally entrusted to one of the Company's civil servants, who was called the

‘Zemindar’ and later the Collector of Calcutta. Under a Royal Charter issued in the twenty-sixth year of the reign of George I. (1727), a Corporation consisting of a mayor and nine aldermen, with a mayor’s court, was established, of which Holwell, the famous ‘Zemindar’ or Collector of Calcutta, afterwards became president. The Mayor’s Court was given civil, criminal, and ecclesiastical jurisdiction over British inhabitants, and dispensed a kind of rough-and-ready justice, according to broad principles of equity. We hear of a tax being levied on the inhabitants of Calcutta for the construction of a town hall or court house to accommodate the mayor and his court, and in 1729 the building was erected on the site now occupied by St. Andrew’s Church.¹

The Corporation seems to have done little to improve the administration of the town; its charter was surrendered in 1753 and a new Royal Charter granted, by which the Mayor’s Court was re-established, and an ineffectual attempt made to organise a municipal fund by the ‘levy of a house-tax of two or three lakhs of rupees, to defray the expense of cleansing and ornamenting the place internally.’ The revenue from ground rents, tolls, and other town dues was partly employed in maintaining ‘an undisciplined battalion of thanadars and peons, constituting the only established guard or night-watch of the city.’

We hear of orders from the authorities to the ‘Zemindar’ or Collector, to ‘make the drains sweet and wholesome,’ and to cut down the jungle in and about the town, but little improvement in the sanitary conditions of the town appears to have been effected. The ditch to the east of the old Fort, into which the bodies of the victims of the Black Hole had been cast, was not filled up until 1766, nor the Mahratta Ditch until 1780, though both had been the dumping-grounds for all the filth and garbage of Calcutta. The city was in fact little better than an undrained swamp, surrounded by malarious jungle and pervaded by a pestilential miasma.

¹ The building was considerably shaken by the cyclones of 1737 and subsequent years, and was, on the orders of Government, demolished in 1792.

In 1790 Grandpré could still write that the public drains were regarded as the natural receptacles for all refuse and filth, that carcasses were left to rot and putrefy in the streets, and that jackals had for two nights preyed on a human corpse thrown down at his gate. The need of drastic measures gradually forced itself upon the attention of the authorities.

The unsoundness of a system which, in addition to his multifarious revenue and judicial duties, made the Collector responsible for public order, convenience, and health, became more and more apparent, as the area and population of the town expanded and aggravated the evils of over-crowding and imperfect drainage.

Appointment of Justices.—In 1794, under the statute 33 Geo. III., the Collector was relieved of his municipal duties, the Governor-General taking powers to appoint Justices of the Peace for the municipal administration of the town, with authority to make regular assessments and to levy rates. This statute may be regarded as a landmark in the development of municipal government in Calcutta.

It is true that before long, as we shall see, all real power began to centre in one person, the Chief Magistrate, responsible not to the people but to Government, while the Justices sitting in quarter sessions became for administrative purposes a mere nullity.

The statute was, however, of great importance, inasmuch as it substituted corporate control and responsibility for the autocratic administration of the zemindar. It bears the imprimatur of Government's faith in committees and in the transplanting of English institutions on to Indian soil.

The system is not yet based on the principle of popular representation, for the Justices are appointed by Government and are liable to removal at the pleasure of Government; but it follows the old English practice of entrusting to Justices of the Peace those administrative functions which, under the local government acts of the last century, are now discharged by elected authorities.

At this time the Governor-General and other members

of the Supreme Council, the Chief Justice and other Justices of the Supreme Court of Judicature at Fort William, were the only Justices of the Peace in Bengal, Behar, and Orissa, and the Governor-General in Council was therefore empowered, by commissions issued from time to time under the seal of the Supreme Court, to nominate and appoint covenanted servants or other British inhabitants to act as Justices of the Peace, for preserving and maintaining the peace, for appointing scavengers, for the cleansing of streets, and to order the watching and repairing thereof. To defray the cost of these services, they were authorised from time to time 'to make an equal assessment or assessments on the owners or occupiers of houses, building and grounds . . . according to the true and real annual values thereof, so that the whole of such assessment or assessments shall not exceed in any one year the proportion of one-twentieth part of the gross annual values thereof respectively, unless any higher rate of assessment shall, in the judgment of the Governor-General in Council . . . become essentially necessary for the cleansing, watching, or repairing thereof, in which case the said Governor-General in Council . . . shall and may on any such urgent occasion, by order in Council, authorise a further assessment, not exceeding in any year the half part of the amount of the ordinary annual assessment hereinbefore limited . . . and that all or every such assessment or assessments shall and may, from time to time, be levied and collected by such person or persons . . . as the said Justices by their order in Session shall direct and appoint in that behalf, and the money thereby raised shall be employed and disposed of according to the orders and directions of the said Justices in Session respectively for and towards the repairing, watching, and cleansing the said streets and for no other purpose.'

The administration of the Justices was divided into three departments: (1) the assessment department, (2) the executive department, (3) the judicial department, or the Justices in Session. The functions of these three departments were respectively (1) to assess the rates;

(2) to provide for the execution of conservancy works, the collection of the assessment, and for the ordinary watch and ward of the town; (3) to approve assessments and to hear and decide appeals or complaints against the assessors and the collectors. We are told that the sessions were at first held once a year, but as the volume of business increased, quarter sessions became necessary. The Justices were assisted by a 'Clerk of the Peace'—a post corresponding to that of a registrar or record-keeper. The establishment of the executive branch consisted of an engineer in charge of roads and conservancy, his executive officer or head overseer, and a staff of clerks and menials. The Justices in Session were authorised under the statute to appoint the Collector of Assessment, but this right was practically usurped by Government in 1830, when the post was attached to the office of Superintendent of Police, the divisional magistrates or justices being relieved of the duties of watch and ward and directed to confine their attention to judicial work. The Justices seem to have set to work at once to improve the town.

In 1799 steps were taken to effect a notable improvement—the metalling of Circular Road. Considerable attention was paid also to conservancy. It was, however, soon evident that the most efficient conservancy could do nothing but mitigate in a small degree the ills under which the city laboured; in the absence of wide roads and systematic drainage, conservancy itself was hardly practicable. Original works of a magnitude which placed them outside the resources of the Justices, were an imperative necessity.

Lord Wellesley's Minute.—Lord Wellesley's famous Minute of 1803 drew attention to the problem, and the long series of important works, which were executed during the next thirty years by his Improvement Committee and the better known Lottery Committee, is an imperishable memorial of his foresight and civic enthusiasm. The work of the Justices, however, was not superseded, though it was overshadowed, by the more imposing and heroic measures of the new committees. 'In the order of Government constituting the new com-

mittee (in 1817), it was laid down that the Lottery Fund should be considered applicable to the expense of excavating new tanks and filling up old ones, of opening new streets or roads, of constructing aqueducts, bridges, ghauts, and other similar works calculated to improve the health, convenience, and comfort of the inhabitants of the city and suburbs, but not to the keeping in repair streets, roads, drains, or other works alluded to, when finished, and that, generally speaking, no expense should be charged to the fund which could properly be included in the assessment department. In other words, the Conservancy Department was to remain and did remain in charge of the Magistrates under the Act of Parliament above mentioned (1793), and the appropriation of the taxes raised under its authority was limited to the purposes therein specified' (Beverley, pp. 47, 48).

The relations of the Lottery Committee and the Justices were thus somewhat analogous to those of the Improvement Trust and the Corporation of Calcutta in our own day.

Concentration of Authority in hands of Chief Magistrate.

—The corporate control of the Justices, however, in their own province gradually gave way to the concentration of authority in the Chief Magistrate's hands. It will be remembered that in theory—under the statute—the administration of the town was vested in the body of Justices, sitting in general or quarter sessions. There were at one time seven Justices or Magistrates, but their number was subsequently reduced to five, including the Chief Magistrate.

The steps by which the executive authority of the Justices in Session was in effect transferred to the Chief Magistrate are not very clear, but the impracticability of administering a city through a body which met so seldom was obvious, and he must have enjoyed a large measure of discretion from the first. A Government resolution of the 12th October 1830 provided that the duties of conservancy should 'continue as before' to receive the especial attention of the person holding the office of Chief Magistrate, and that he should exercise

an active and personal superintendence over the establishment maintained. When the Fever Hospital Committee took evidence in 1837, we find the supreme control of the conservancy, assessment, and the police all centred in the person of Mr. D. M'Farlan, Chief Magistrate. He authorised all expenditure and sanctioned all disbursements in the Assessment, Judicial, and Conservancy Departments. He had cognisance of all complaints and questions relative to the Assessment, although the appointment of assessors still required the sanction of the Justices. He dealt with complaints preferred against the Collector, and in the event of collections proving unsatisfactory, it was to him that the Collector's explanation was addressed. The Superintendent of Police was subject to his general control, in much the same way as a District Superintendent of Police is now subordinate to the District Magistrate. The Superintendent of Roads and Conservancy enjoyed much less independence than the Superintendent of Police, and all estimates for repairs exceeding Rs25 required the Chief Magistrate's sanction. The virtual supersession of the Justices as a body, provoked some natural jealousy and bitterness.

Mr. C. K. Robison, one of the Justices, unburdened himself as follows to the Fever Hospital Committee :—

‘At present I am directed not to execute the powers given me by Acts of Parliament, and am expected to act in constant violation of the law ; I trust that is not to continue ; in truth, eleven-twelfths of what I now do is illegal. I never, however, join in legalising the assessment, as the disbursement is taken out of my hands, and I ought not to be responsible for the expenditure of others.’ Again he stated : ‘It has never been left to the Magistrates to show how they could manage the assessment, I am prevented from interfering though I have the responsibility. It has been in the hands of the Chief Magistrate, in fact, in the hands of Government, and the funds pass through the Treasury. My mind leads to municipal management.’ The jealousy and rivalry engendered by the anomalous position of the Justices sometimes extended to the details of administration.

Some of the conservancy sirkars were not directly subordinate to Lieut. Abercrombie, the Superintendent of Roads and Conservancy, and frequently submitted reports to the magistrates of their divisions. The Superintendent, in an able note to Government, complained of the subversion of his authority which this procedure caused, and from the tone of his memorial it is clear that the control, which he did not resent when exercised by the Chief Magistrate, was rendered irksome by the other Justices.

There can be no doubt that M'Farlan, a man of considerable ability, was conscientious and thorough in the discharge of his many duties,¹ but as Mr. Robison stated, it 'seemed impossible for one man, however great his talents and fitness for the task, to superintend efficiently a population so large and scattered as of this city, and this system, as it appeared to me, deprived the community of the efficient co-operation of four other Magistrates, who could have most advantageously shared the task.'

Adumbration of Representative Government.—In spite of the great works which the proceeds of the Lotteries had served to finance, Calcutta, after forty years of the Justices, was still a standing offence against all the canons of municipal science. Local taxation, however, was still almost an untried principle, and the Chief Magistrate, who derived his authority from Government and not from the people, clearly recognised the danger, although he grasped the need, of further taxation unless authorised by the consent of the people or their representatives. It would be a mistake to look on the authorities of this time as placidly acquiescent in the unhygienic and insanitary conditions of the city. Municipal reform was in the air, but the *non possumus* of finance could only be overcome by calling in the King Stork of taxation.

In this view, the drawbacks of the paternal system of municipal government became apparent. The system was destructive of self-reliance on the part of the citizens; Government spent all town or municipal funds, and considerably more, in maintaining the municipal services,

¹ On the other hand, his notes frequently suggest a fondness for a policy of *laissez-faire*.

and it was inevitable that the people should prefer this system, with all its imperfections, to one which combined new privileges with additional burdens. The system, however, possessed other inherent defects.

In the first place, the Chief Magistrate combined in his person the offices which are at present held by the Chairman of the Corporation, the Commissioner of Police, and the Chief Presidency Magistrate, and we may agree with Mr. Robison that these duties were beyond the capacity of one man. Secondly, in the words of M'Farlan himself, 'arrangements connected with the cleanliness and convenience of a neighbourhood, with the good state of its roads and drains, can never be permanently managed with efficiency without the active assistance and constant interference of the community itself.' Such co-operation was more necessary, inasmuch as the public convenience was not guarded by the elaborate conservancy code of modern times. Lastly, the control and supervision of the machine had evolved in a makeshift and haphazard manner, and the result was often inefficiency. The Superintendent of Roads and Conservancy found no place in the statute of 1793, and we have seen that the interference of the Justices in matters of detail tended to undermine his authority. Large arrears of taxes had accumulated, and the system of accounting, as the Fever Commission showed, left room for fraud on the part of the staff; the periodical revision of the assessment was performed in a perfunctory style and the valuation of the town was apparently too low. In short, it was clear that the administration, no less than the constitution, required overhauling.

M'Farlan's Scheme.—It was M'Farlan himself who, in 1833, made the first proposal for an experiment in representative government. He suggested that 'municipal committees' should be elected by ratepayers of a certain qualification in each of the four divisions, into which the town was divided. The committees were to be of an advisory character, and may be regarded as an adumbration of the modern District Committees. They were to consist of seven or nine members, the Chief

Magistrate and the Divisional Magistrate being members *ex officio*. The management of the conservancy, subject to the veto of the Chief Magistrate, was to be placed in their hands, allotments equivalent to the average annual expenditure under this head in their respective divisions being provided for disbursement in accordance with their views. Government most promptly authorised the Chief Magistrate to arrange for the appointment in one division of a 'Public Committee' such as he had proposed. A circular letter was issued by M'Farlan 'to the owners and occupiers of premises in Calcutta,' in which the defects of his own administration are candidly admitted, while the urgent needs of the city and the character and possibilities of the 'Committees' are eloquently described. The scheme, however, was still-born. M'Farlan himself appears to have been discouraged by the cold reception which his letter obtained from the public.

'The people,' he says, 'who attended to the matter at all, were somewhat surprised at such sentiments being entertained by the Government and those employed by it. Some were gratified and others quite the reverse. The Press, I think, applauded and then showed that the veto was enough to negative the whole question. I had calculated on some members of the Bar, or other usual leaders of the Calcutta public, taking up the question. I found them very indifferent about it. Support was promised generally and coldly; no one was disposed to take a lead. . . . There was upon the whole abundant evidence that Calcutta was not ripe for popular measures of this description.' A year later M'Farlan wrote to Government informing them that no Conservancy Committee had yet been appointed, and he saw at present no 'immediate prospect of their being so.' He attributed the failure of his scheme to the indifference of the inhabitants, and traces 'this apparent apathy' to the following causes: 'the absence of any grievous evils connected with the Police, the removal of which could obviously be effected by means of Committees—the want of idle men of talent for business—the belief that Government is bound to effect improvements—the general belief that

the funds of the town are honestly managed—the apprehension that the Committee plan might lead to heavier taxation—the want of any known Code of Rules, pointing out the mode in which meetings could be held and Committees appointed and their powers defined—and lastly, to the want of a sufficient personal stimulus, arising from expected honours, rank, or political influence, connected with the discharge of the duty.’

Some of these reasons do not appear very cogent, and it is possible that M’Farlan was too easily discouraged. The delegate of the Trades Association, when examined by the Fever Committee, expressed the opinion that the scheme had failed, ‘because a veto was reserved for the Magistrate of the Division, and a final veto for the Chief Magistrate, and nobody would act under such a system; besides, it was never pursued to a conclusion, but allowed to die a natural death.’ Government, however, did not despair, and the appointment of the Fever Hospital Committee in 1836 gave Lord Auckland his opportunity.

Fever Hospital and Municipal Improvements Committee.—This famous Committee marked an epoch in the municipal history of Calcutta. The final instalment of its Report was not issued until 1847, and its herculean labours over many years succeeded in riveting the attention of all men on the important problems which clamoured for solution. Its monumental Report throws a flood of light over municipal Calcutta of this time, and its sober and weighty conclusions formed a starting-point for the energetic period of reform which was soon to follow.

Its appointment was primarily due to the enlightened zeal of Mr. (afterwards Sir) James Ronald Martin, surgeon of the Native Hospital in Dhurrumtollah. His *Note on the Medical Topography of Calcutta and its Suburbs, chiefly with reference to the condition of the Native Health*, recommending the establishment of a Fever Hospital, and the sanitation of the town, excited the sympathy and interest of his Board of Governors. Government’s attention was attracted, and Lord Auckland gave an official status to the Committee, which had been appointed

at a public meeting in the Town Hall to consider Mr. Martin's proposals. The Governor-General, in his capacity as Governor of Bengal, authorised the Committee to take evidence, added two members to their number, and gave his approval to their intention to undertake—in addition to the Hospital scheme—the more difficult and important task of endeavouring to frame such a plan of Local Management and Taxation . . . as may be best calculated to secure efficiency and general confidence in the application of the funds collected.' Within the terms of the Committee's reference was included the discovery of 'some plan of judicious and adequate Local Taxation and independent Local Management, in the direction, as in the burdens, of which all who might be most interested should take their share.'

Sir John Peter Grant was an able chairman, and the Committee's exhaustive inquiry covered the whole field of municipal activities. It enlarged upon the prevalence of fever, and on the authority of its medical experts attributed this dreaded scourge to defective drainage; it established the need for a great central hospital and additional dispensaries; it called in engineers to refute the view that Calcutta, by virtue of its position, was beyond the powers of sanitary science, and discussed exhaustively the rival drainage schemes which its expert witnesses favoured; it devoted some attention to town-planning, and advocated the construction of more thoroughfares; it pressed for the excavation of large tanks or reservoirs to supplement the water supply; its members explored in person the most noisome quarters of the town, and the defects in conservancy were laid bare; the details of the administration were minutely scrutinised, and one high official made good from his own purse a deficiency of some 11,000 rupees which their audit revealed; the police establishment, both for the town and the river, was overhauled, and great economies proposed in connection with the Magistracy, and the Excise, Collection, and Assessment Departments.

The question of finance received its proper attention; the sources of revenue were acutely analysed and proposals

made for financing a comprehensive drainage scheme, which the Committee rightly regarded as the salvation of the town.

On the subject of municipal self-government, the Committee's conclusions were even more conservative and cautious than the proposals of 1833. They were of opinion that the native inhabitants of the town were not yet ripe for self-government, and that the European townsmen were neither so numerous nor so permanent in their residence in India as to justify any plan of municipal government which was based upon popular election. At the same time the Committee recognised that, 'considering the rapid progress now making in education, many years will not elapse before a class of natives will be found in Calcutta, able and willing to aid their European townsmen in performing those municipal duties usually entrusted to the inhabitants of cities in Europe; and your Committee therefore feel anxious that some preparation should, if possible, be made for so training the inhabitants of Calcutta, that they may in time relieve the Government entirely from the attention which it is now compelled to give to these minute details.'

The Committee went on to propose that 'the revenue in the Conservancy Department, including the collection of the House Tax and Abkaree Taxes, should be placed under executive officers, and that a Board of Commissioners of Public Health and Conservancy should be annually elected by resident householders, occupying houses of at least the value of 50 rupees per mensem, with power to examine and audit all accounts relating to the Conservancy Department, and to report on the same to Government, and also to suggest the opening of new thoroughfares, and other improvements, the Government being empowered by law to carry their suggestions into effect, if it approve of them.'

In regard to taxation, the Committee proposed that a tax on carriages of all kinds should be introduced, and recommended that 'for the expenses of the general improvements of the town,' *a large sum of money should*

be raised by way of loan,¹ the payment of interest and repayment of the principal being guaranteed by Government. They proposed that an additional assessment of $2\frac{1}{2}$ per cent., authorised under the statute of 1793, should be made on all houses of the value of 50 rupees per mensem and upwards, and that the proceeds of this tax, amounting (after allowing for vacancy and collection charges) to 75,800 rupees, should be utilised for the payment of interest on the loan and to form a sinking fund for liquidation of the principal.

Experiment in Local Self-Government.—The immediate outcome of the Committee's labours was Act XXIV. of 1840.² It not only modified the purposes to which the rates levied under 33 Geo. III. c. 52 might be applied—such purposes now becoming the lighting and watering of roads and streets, and the cleansing and repairing of roads and streets and drains—but also empowered the Government, on the application of two-thirds of the ratepayers in any one of the four divisions of the town, to entrust to them the assessment, collection, and management of the rates of their division. The Justices were required to publish in quarter sessions a detailed statement of the expenditure of the public funds. The appointment of assessors and collectors was transferred from the Justices to the Governor of Bengal.

The scheme was however not only encumbered by elaborate conditions, but was also undoubtedly in advance of the times. No application was made to Government under the Act, which thus became entirely inoperative. Under Act XVI. of 1847, a further attempt at local self-government was made. The preamble to the Act recites the various defects in administration to which the Fever Hospital Committee had drawn attention—in sewerage, drainage, water supply, conservancy, provision of open spaces, repairs to roads, street lighting, provision of broad thoroughfares, prevention of nuisances, and the provision of medical relief for the poor.

Régime of Improvement Commissioners.—The Act trans-

¹ This wise and far-sighted proposal was unfortunately not adopted; the first loan was raised as late as 1864.

² See Appendix II.

ferred the conservancy functions of the Justices to a Board of seven Commissioners,¹ of whom three were to be appointed by Government and one elected by the rate-payers for each division of the town. It authorised for the first time the levy of a tax on houses and vehicles, and extended the purposes for which the rates and taxes might be employed.² The Commissioners were to receive salaries at a rate to be fixed by the Governor. A short but important Act (XXII. of 1847) was passed in the same year, which authorised the Commissioners to purchase and hold real and personal property for the improvement of Calcutta. It constituted them a corporate body with a common seal and the right to sue and be sued by the name of Commissioners. Act II. of 1848 vested the management and control of the streets in the Commissioners; it recognises the deficiencies of the town in the matter of its water supply, its narrow winding lanes, and its drainage, and provided for a survey of the town as a preliminary to the contemplated reforms in sanitation. The regulation of new buildings was also dealt with. The Act authorised the appointment of a Town Clerk (subsequently designated Secretary), a Surveyor, and other officers, which appointments, on salaries to be fixed by Government, were to be subject to the approval of the Governor of Bengal.

This Act, however, as the preamble to Act X. of 1852 sets forth, proved unsatisfactory and ineffectual. Lieutenant-Colonel Thuillier, in his evidence before the Municipal Committee of 1861, said of this Board that it 'used to talk a great deal and write immensely, but very little was ever effected.'

The unity of purpose, which had been the chief merit of the centralisation of authority in the Chief Magistrate, had in fact been sacrificed without any corresponding

¹ Mr. J. H. Patton, Mr. F. W. Simms (F. A. Lushington appointed in 1849), Mr. J. T. Pearson, Babu Chandra M. Chatterjee (Babu Bhuvan M. Mitter appointed in 1849), Babu Tarini Charan Banarji, Babu Dinabandhu Dey, and Mr. H. E. Watts.

² Such purposes were (1) conservancy, (2) construction of tanks and aqueducts, (3) opening of streets and squares, (4) lighting and watering of streets, (5) filling up of stagnant pools, (6) removing obstructions, and (7) general embellishment of the town.

gain. The elections tended to become a farce, in which Indian gentlemen of position were reluctant to engage, and the system though based on the representative principle was not in fact democratic. The division of authority and responsibility in the administration deprived the city of the strength and consistency of policy which were the *sine qua non* of improvement and progress. Under Act X. of 1852 the town was divided into the Northern and Southern divisions, and the Commissioners reduced to four in number,¹ of whom two were to be appointed by Government.

The Commissioners were to receive salaries not exceeding Rs250 a month.

The carriage and horse tax, which had proved troublesome in collection, was abolished, and the house-rate was raised to 6½ per cent.; the assessment was to be made by the Commissioners, who were vested with the powers of Justices of the Peace under the statute of Geo. III.

The Commissioners were empowered to appoint and dismiss all officers except the secretary, whose appointment or dismissal was made subject to the approval of Government.

Colonel Thuillier, who was one of the Commissioners, stated that he looked on 'such a Board, only worked through the casting vote of the Chairman, as a perfect farce.' The annual reports which the Board submitted, indicate a recognition of the most urgent needs of the town, and it must not be forgotten that the Board was much hampered in its larger schemes by the imperfection of its statutes. Its failure however served for the time to discredit the elective principle: the law, while providing for the registration of voters, had omitted to make registration an indispensable qualification, and the defect was fatal. The elective principle was condemned, and its operation suspended by Act XXVIII. of 1854, which empowered the Lieutenant-Governor to fill up vacancies in the Board. The personnel of the Board,

¹ Mr. W. A. Elliott (succeeded by Mr. Wauchope and later by Mr. Cockburn), Lt.-Col. H. L. Thuillier, Babu Tarini Ch. Banarji (also Babu Bhuban M. Mitter), and Babu Dinabandhu Dey.

however—S. Wauchope, Major (afterwards Colonel) Thuillier, Tarini Charan Banarji, and Dinabandhu Dey—remained unaltered. Their most notable achievements were the commencement of the Halliday Street scheme and the appointment as Secretary and Engineer of William Clark, to whom Calcutta owes its first great drainage scheme.

Legislation of 1856.—The conservancy of the town was still deplorable and it was recognised that a more stringent and elaborate law was required. Act XIV. of 1856 was a very complete Conservancy Act; Act XXV. consolidated the provisions for the assessment and collection of rates; while Act XXVIII. of the same year incorporated the provisions of Act XXV., made ‘better provision for the appointment of Commissioners for the conservancy and improvement of the town,’ and authorised the raising of additional funds for improving its drainage and lighting. The number of Commissioners was fixed at three,¹ who were to be appointed by the Lieutenant-Governor, and to be liable to removal at his pleasure. The salary of a Commissioner holding no other appointment was not to exceed Rs10,000 a year, while the salary of a Commissioner with other occupation was limited to Rs4000 a year. The house-rate was raised to 7½ per cent., out of which 1½ lakhs were to be set aside each year towards the cost of a complete system of drainage, while a sum of Rs30,000 was to be set aside for water supply.

A lighting-rate of 2 per cent. was sanctioned and the tax on vehicles and animals revived. The registration of carriages and carts plying for hire was made obligatory, and we soon find the Commissioners moving for additional powers for the control and regulation of hackney carriages. The sphere of municipal activities was widened by definite provisions which dealt with the construction of footpaths, the improvement of the road-line and the regulation of building, the erection of huts in proper lines, the supply of water in case of fire, the regulation of the sale of food-stuffs and of offensive trades, the framing of bye-laws for the control of markets, bazaars, and

¹ Mr. Wauchope, Lt.-Col. H. L. Thuillier, and Baron Dowleams.

slaughter-houses, the provision of public conveniences, the cleansing and ventilation of sewers, and the removal of projections and encroachments. The Commissioners under the new Acts were Messrs. Wauchope, Thuillier, and Dowleas ; the last named was a whole-time officer and did the bulk of the work. After nearly twenty years of experiments and failures, the powers of the Chief Magistrate had passed into the hands of an autocratic triumvirate, one member of which (Wauchope) held also the office of Commissioner of Police. It is clear to us, who look back on the growth of municipal self-government, that the reaction could be only of a temporary character, but it is only just to acknowledge the vigour and foresight of the new commission. The appointment of the Municipal Committee of 1861 was no doubt an indictment of their administration, but it must not be forgotten that their resources were utterly inadequate, and the elaborate provisions of the new Acts often impracticable.

Their annual reports have an interest which documents of this genus often lack. We see the stirring of ideas and an energetic attack on problems which had long been recognised but never faced. They declaim, perhaps too impatiently, against the apathy of the Indian population, and refute with perhaps unnecessary warmth the charge of preferential treatment of the European quarter ; but, with most limited means they effected many judicious and beneficial improvements.

Their conversion of such blots on the town as Dunkin, Money, and Bamun bustees into excellent building sites showed the liberal return in public comfort and amenities which a trifling expenditure could at that time secure in undeveloped properties ; the completion of the Halliday Street scheme was effected, the tanks in Cornwallis and College Squares were improved, and a footpath made along a part of Chowringhee. Road repairs, conservancy, and street-watering still absorbed the major portion of the revenues, but the Commissioners obviously chafed at the limits within which their resources held them ; it seemed to them that ' Calcutta, with trifling exceptions, is in 1858 what it was half a century ago.' They realised

the value of municipal statistics, and suggested that the time had come 'when the appointment of a regular statist had become highly desirable.' But their chief claim to our gratitude is the fact that they succeeded in making a beginning of the great drainage scheme for which Calcutta had waited so long. In the meantime, however, the conservancy of the town was still unsatisfactory, less from the lâches of the Commissioners than from the insolubility of the problem, except at great cost.

In 1861 the Trades Association pressed for the appointment of a committee to examine into the question of municipal administration and the introduction of a plan of government more adequate to the requirements of the town.

The Seton-Karr Commission of 1861.—A mixed Commission was appointed by Government, and submitted its report on the 31st August 1861. They stated that the 'main want of Calcutta was an adequate supply of funds,' and made the following proposals for augmenting its revenues :—

- (1) The imposition of a water-rate not exceeding $2\frac{1}{2}$ per cent. ;
- (2) The doubling of the carriage and horse tax ; and
- (3) The introduction of a registration fee of Rs6 a year for every cart and hackery.

They recommended that the town should be divided into six districts, each with a board of six honorary members appointed by Government, and vested with complete control over the conservancy and construction of new works in their own district.

A central board, consisting of six representative members¹ appointed by Government, was to exercise a general control ; it was to be entrusted with the collection and allotment of funds, to execute important works, and to deal with the purchase of land and the improvement of roads.

¹ Viz., (1) the Commissioner of Police—President, (2) a member of the Chamber of Commerce, (3) a member of the Trades Association, (4) a member of the British India Association, (5) a medical man or an engineer, and (6) one of the other Commissioners on an adequate salary.

The Local Boards were to be responsible for the proper expenditure of funds allotted to them, but were to have no control over the assessment or collection of taxes, and no power to initiate general schemes. The Commission was opposed to the existing system, with its concentration of authority in the hands of a triumvirate or where conservancy arrangements were in question, in the hands of its whole-time member.

The Commission's scheme was in the main a system of self-government, though not based on the fundamental principle of election; it was apparently acceptable to the public, and Government consented to give it a trial. On the 29th March 1862 a Bill was introduced in the Bengal Council. There were however strong misgivings in Council as to the wisdom and practicableness of the new proposals, and in the end the Bill was withdrawn. It was believed that the most suitable form of government for Calcutta was one which combined popular representation with the concentration of executive power in the hands of a highly paid officer.

Régime of the Justices of the Peace (1863-1876).—A new Bill (Act VI. of 1863) was accordingly framed, 'with the object,' as Sir Ashley Eden said, 'of entrusting intelligent gentlemen chosen from among the ratepayers with a very considerable control over the municipal government of the town, and at the same time providing that the work of the municipality shall not be liable to interruption or delay from any omission on their part to attend to their duties.' The general control of municipal expenditure was to be vested in a large body of councillors, while the execution in detail of all sanctioned works was to be entrusted to a well-paid officer, devoting his whole time and energy to the work. Thus under the new Act, the property of the town of Calcutta and the general management of its municipal affairs, were entrusted to a corporation, consisting of all Justices of the Peace for Bengal, Behar, and Orissa, who might be resident in Calcutta, along with the Justices of the Peace for the town.

The appointment of their Chairman rested with Government, but he might be removed by a resolution

of two-thirds of the Justices. The Justices were to nominate their own Vice-Chairman, who was to preside over meetings in the absence of the Chairman, but the appointment required the Lieutenant-Governor's approval.

He too was liable to be removed by Government, on the requisition of two-thirds of the Justices. The powers of the Chairman and Vice-Chairman were to be exercised in carrying out the orders of the Justices or in executing works sanctioned by them, and generally in the management of municipal business. These officers were not to act in opposition to, or in contravention of any order of the Justices, nor to usurp any power expressly reserved to the Justices; committees of a general or special nature might be appointed by the Justices at their discretion, the Chairman or Vice-Chairman to be a member of every such committee. The appointment of the superior staff, consisting of the secretary, engineer, surveyor, health officer, collector and assessor, was made by the Justices. All minor officials were appointed by the Chairman, subject to the confirmation of the Justices in the case of appointments carrying a higher salary than Rs200 a month. A tax on trades and professions, which had been discussed by the Fever Hospital Committee, was introduced, the maximum house-rate was fixed at 10 per cent., and provision was made for the imposition of a water-rate. The right of the Justices to expend municipal funds as they thought fit was limited only by the obligation to obtain Government sanction for any work estimated to cost more than Rs50,000. The new Corporation had barely got ready for the fray before a weak joint in its armour was brought to the notice of Government. The Sanitary Commission of Bengal, in a Minute dated the 5th March 1864, recorded a scathing condemnation of the sanitary conditions of Calcutta. The Commission believed that 'if a plain unvarnished description of the streets of the Northern Division of Calcutta, bordered by their horrible open drains, in which almost all the filth of the city stagnates and putrefies, were given to the people of England, they would consider the account altogether incredible.' They

declared that 'the state of the capital of British India was a scandal and a disgrace to a civilised Government,' and that it was 'literally unfit for the habitation of civilised men.' The most important streets and thoroughfares of the Northern Division formed 'to all intents and purposes a series of huge public latrines, the abominable condition of which cannot be adequately described.'

The first thing required was 'an Executive Authority strong enough . . . to enforce the law for the suppression of the present disgusting nuisances.'

The Minute recognised the injustice of throwing the discredit of these abuses on the new Corporation, but stated that in matters of conservancy the Municipality is and must always be practically dependent upon the Police for the means of executive action. It was the duty of the Police, under the law, to assist the Municipal authorities in the suppression of nuisances," in some cases, to act themselves and arrest without warrant ; in others, to give immediate information to the Justices.'

The new Act however in making the Police independent of the Municipal Executive, had struck a fatal blow at the co-operation, on which efficient conservancy was based, and the Commission saw no hope of improvement unless the offices of Chairman of the Justices and Commissioner of Police were again combined. The separation of these offices had been conceded as an experiment, in deference to public opinion, but the advantages of the old system which the Minute of the Sanitary Commission so strongly emphasised, soon became apparent and the offices were again combined during the chairmanship of Sir Stuart Hogg.

Working of the New Act.—A decade of strenuous activity followed. The raising of the house and water rates, the sanction of a special loan by Act VIII. of 1870 for the erection of markets, and the increase by legislation of the general borrowing capacity of the Corporation, at last provided adequate funds, and a combined system of drainage and water supply, apart from its immediate benefits, made possible the vast strides in sanitation which the ratepayer of to-day can only appreciate if

he comprehends the conditions under which the last generation lived. Contemporary opinion was perhaps more impressed by the defects of the new constitution than by the solid results which it achieved, and in 1872-73 Sir George Campbell, Lieutenant-Governor of Bengal, recorded the opinion that the system was only possible where the Chairman was able to exercise a strong personal influence over the Justices. 6409

The clumsiness of its machinery—with its 120 Justices, even after the exclusion of the Provincial Justices by Act VI. of 1871—and the want of definition and distinctness between the powers of the Justices and the Executive, which led to constant struggles between the strong personality of Sir Stuart Hogg and those Commissioners who prided themselves on the title of the 'Left' or opposition, caused some men to look with envy on the more business-like body in Bombay, while others saw in the official chairman a perpetual negation of the principle of self-government. Some thought that every notable reform was due to the initiative of the Chairman, who by the aid of a minority often succeeded in persuading the majority; to others, a spirit of criticism and distrust appeared the only effective check on the extravagance of the Executive. Kristodas Pal, whose eloquence would have won him an audience in any assembly, admitted that there was 'much speaking' among the Justices, and that the conflict of authority should be set at rest by the careful definition of powers. The Lieutenant-Governor, Sir Richard Temple, thought that a smaller body of Commissioners¹ might prove more suitable for executive purposes, that better arrangements were necessary to secure the active co-operation of all the Justices, and that representation should be placed on a broader basis. He was prepared to consider the introduction of the elective principle which his predecessor Sir George Campbell had favoured. The expediency of limiting the tenure of the office of Justice, if the existing system were continued, appeared to him to deserve consideration.

¹ In 1875 there were 153 Justices (98 Europeans, 46 Indians, and 9 of other nationalities).

In 1870 Mr. H. H. Sutherland moved that Government should be requested to appoint a Commission to consider the working of the existing system, and the expediency of introducing some form of government more suited to the requirements of the city. The motion was lost by a small margin. In February, and again in March of the same year, Mr. Wilson, editor of the *Indian Daily News*, brought forward similar motions, which however were ruled out of order. In 1872, when Sir Stuart Hogg applied for twenty months' leave, Mr. J. B. Roberts—one of the 'Left'—informed an unsympathetic House that he had applied to Government for the officiating appointment of Chairman of the Justices. There can be little doubt that on the whole the new system had worked well; if the Chairman sometimes looked back with regret on the autocratic powers of the triumvirate, he certainly recognised on reflection that it was the division of power with the representatives of the people which had made possible the great works on which the welfare of the city depended. There can be no better testimony to the success of Act VI. of 1863, than the fact that Sir Stuart Hogg and the Justices themselves were on the whole averse to any fundamental change of the constitution in 1876.

The legislation of this year was originally introduced with the idea merely of codifying or consolidating the municipal law. Since 1863 some ten modifying Acts—apart from the Acts relating to markets—had been passed, and it had become essential to incorporate them in one convenient code. When the new Bill, however, was introduced in Council, the discussion of its details and its scope led to some criticism of the radical defects of the old Act; in the end Government proposed to make material changes in the constitution and the scheme suggested by Sir Richard Temple became the basis of the new Act. The elective principle was the corner stone of the new edifice.

Introduction of the Elective Principle.—Under the new Act (IV. of 1876), two-thirds of the Commissioners, who numbered seventy-two, exclusive of the Chairman and

Vice-Chairman, were to be elected by the ratepayers, the remainder being appointed by the local government.¹ The electoral divisions were to correspond with the thanas or police divisions; they were eighteen in number, and were termed 'wards.' Six of these divisions returned only two Commissioners, while twelve had each three representatives; voting was by voting papers, and male residents of the town or suburbs were qualified to vote, if they had paid an aggregate amount of not less than Rs25 as house-rate, water-rate, police-rate, or lighting-rate, or as taxes on carriages and animals, or professions, trades, and callings. Residents of the town or suburbs, who had paid aggregate rates or taxes of not less than Rs50, were qualified for election as Commissioners. The tenure of office was limited to three years.

The appointment of the Chairman who might hold the office of Commissioner of Police, of the Vice-Chairman and other officers, as well as the appointment of Committees was governed by provisions practically identical with those contained in Act VI. of 1863, except that under Section 32 of the new Act the appointment of all statutory officers was subject to the approval of the local government.²

There were salutary provisions for the payment of interest on the municipal debt and for the formation of a 'reserve fund; sufficient allotments were to be made for the maintenance of the police; the new underground drainage works were to be completed and extended throughout the town, the water supply maintained and adequate conservancy arrangements to be made. Criticism was directed chiefly against the provision which enabled the local government to intervene, if at any time

¹ The Select Committee, which reported on the draft Bill, proposed that three-fourths, or fifty-four, of the Corporation should be elected, *but also* that the number of Hindu, Muhammadan, and other elected members should be fixed by statute; the popular party preferred to purchase the abandonment of the principle of sectional representation by consenting to an increased proportion of nominated members. The two alternatives had been impartially offered for consideration by the Lieutenant-Governor in addressing the Council on the 27th November 1875, before the draft Bill was prepared.

² Act II. of 1888 went further, in making all appointments worth more than Rs500 a month, subject to the approval of Government.

it was of opinion that the Commissioners had failed in their conservancy duties. In these circumstances Government was authorised to appoint a commission of inquiry and on its report might require the allocation of additional funds for conservancy; if the Corporation declined to allot such funds or to carry out the recommendations of the Commission, the Local Government could empower the Chairman to carry out its orders, notwithstanding any powers conferred by the Act upon the Commissioners.

The forward party resented the check which this provision imposed on the principle of self-government; Sir Stuart Hogg¹ declared that it was impossible for Government to shirk its ultimate responsibility for the efficient administration of the town, but to many the provision seemed the negation of self-government, and a standing proof of Government's distrust in their ability to administer their own affairs. Many of the Justices and the British Indian Association were of opinion that if the citizens of Calcutta were to be given self-government at all, the gift should be absolute and without reservations. A more moderate view was, however, expressed by the Indian League, an association which was said to represent the 'Young India' of the day; they regarded 'a system of election subject to Government control' as at least superior to the existing system of municipal government. They thought such control was to be preferred to 'the control of Ap-ke-waste Justices,'² and their spokesman, while admitting that there were 'a good many independent and honourable gentlemen whose abilities and talents would do honour to any Council,' asserted nevertheless

¹ Under the Act of 1863 Government possessed no express or formal control over the Municipality; the Justices were, however, nominated by Government, and their number was not limited by statute, so that in the last resort it was possible to swamp opposition by making fresh appointments. In practice, therefore, Government had possessed, as Sir Richard Temple pointed out, the most perfect kind of control possible.

² The phrase is said to have originated thus: a Muhammadan Justice who knew too little English to follow the debates of the Justices, being called on to vote and desiring loyally to support the Executive, exclaimed 'Ap-ke-waste' (I vote with you, Sir), in his ignorance of the Chairman's views.

that 'the vast majority of the existing Justices were men in whom they had no confidence, and between whom and the ratepayers there was no community of feeling and interest.'¹ He recognised that Government, 'in the beginning of an important and novel experiment,' must naturally 'be solicitous, and anxious to keep certain powers in their hands,' but trusted that Government would not 'interfere except under very exceptional circumstances.' No actual use of the provision was made until 1884.

Origin of the General Committee.—It soon became evident that a large deliberative body could not advantageously deal with details of business, which it was required to superintend.

In 1877 a committee which had no statutory sanction, was appointed under the name of the Town Council, in which were merged the Finance, Roads, Conservancy, and Water Supply Committees. The innovation was a decided success, and Act VI. of 1881 at last invested the Town Council with a legal status. This Act did not limit the number of members, which in practice consisted of thirty—a number far too large for the convenient or orderly transaction of the business coming before it.

All financial questions, as well as any question which did not fall within the purview of one of the standing committees, were laid before the Town Council. In short, as defined in the Act of 1881, it was a committee for the consideration of such matters as the Commissioners might think fit to refer to it, with a view to advise and aid the Chairman in the discharge of any portion of his executive work. It was subsequently known as the General Committee, as it was pointed out that a Town Council in ordinary English usage corresponded with the general body of the Corporation.

It will have become clear to the reader that the cardinal principle, underlying all municipal changes and

¹ Babu Kali Mohan Das, representing the Indian League, whose memorial bore the signatures of 13,400 ratepayers, before the Select Committee on the Municipal Bill of 1876.

reforms in Calcutta, has been the quest for an efficient system of conservancy, and in 1884 the sanitation of the town once more engaged the attention of Government.

Commission of 1884.—In response to a memorial presented to Government, a Commission, consisting of Mr. Beverley, I.C.S., Dr. Lidderdale, Sanitary Commission, and Mr. H. J. S. Cotton, the Corporation representative, was appointed that year under Section 28 of the Act to inquire into certain matters connected with the health of Calcutta.¹ The labours of the Commission extended over several months; they made many local inspections, chiefly in the northern quarter of the town, and examined several witnesses—amongst them Mr. Thomas Jones, whose self-imposed investigation into the sewers of Calcutta in 1882-83 had aroused considerable interest and some uneasiness amongst the public.

The majority of the Commission, while recognising the many improvements effected by the Corporation since 1876, expressed their opinion that the cleaning and conservancy of the town was still defective. They stated that the Commissioners had been eminently successful in the control of their finances: 'their budget system is strict, and they have taught the Executive to respect it.' They doubted, however, whether 'the expenditure for the cleaning and conservancy of the town had been on a scale commensurate with its requirements,' and were impelled to the conclusion 'that the sanitary requirements of the town had been sacrificed to the desire to maintain the house-rate at $7\frac{1}{2}$ per cent.' Their report concluded with a summary of their recommendations under the heads of Drainage, Water Supply, Latrines, Roads and Conservancy, Compilation of Statistics, and—most important of all—a proposal for the amalgamation of the suburbs with the town.

Mr. Cotton recorded an interesting Minute of Dissent, in which he vigorously defended the Corporation and deprecated the Lieutenant-Governor's resorting to the statutory powers vested in him of directing the Com-

¹ The appointment of the Commission was strongly resented by the Corporation.

missioners to carry into effect the recommendations of the Report.

Many of these recommendations dealt with the details of administration and their adoption was obviously best left to the discretion of the Commissioners, but the question of placing the suburbs under the same municipal government as the town came under a different category. The insanitary conditions of the suburbs were a matter of common knowledge; there was no underground drainage, no pure water supply, but instead an almost entire absence of the elements of order and cleanliness. The health of the town could obviously not remain unaffected by the existence of insanitary areas on three sides of it and it was easy to adduce arguments to prove that the best interests of both the town and the suburbs required their union under one municipality.

A committee which was appointed about this time to report on the proposal for the levy of an octroi in Calcutta, had independently come to the same conclusion as the Sanitary Commission, and the Lieutenant-Governor in his resolution dated the 20th June 1885 definitely accepted the principle of amalgamation, and appointed a small committee to consider and report on the details and to advise the lines on which the necessary legislation should proceed.

The constitution of the enlarged municipality, its financial prospects, and its electoral divisions, were dealt with in a brief but extremely lucid and forcible report, and legislation was sanctioned to give effect to its proposals.

Act II. of 1888.—The most important changes introduced by Act II. of 1888 were the following :—

- (1) The increase in the number of Commissioners to 75, of whom 15 were to be appointed by the Local Government, 50 to be elected by ratepayers (2 by each of the 25 wards into which the enlarged municipality was divided), 4 to be selected by the Bengal Chamber of Commerce, 4 by the Trades Association, and 2 by the Port Commissioners. Under the Act of 1876, the professional and land-

owning interests had greatly preponderated on the Corporation and it was thought advisable to secure a more adequate representation of the commercial and trading classes.

(2) The Town Council was reconstituted as the General Committee consisting of 18 members of whom 12 were to be chosen by the elected Commissioners and 6 by the nominated Commissioners. The reduction in its numbers had important consequences and its powers were secured to it by statute.

It was made the Budget and Finance Committee of the Corporation with power also to deal with any other business that might be expressly referred to it.

The Chairman and the Vice-Chairman were to be *ex officio* members of the Committee, and the Chairman or in his absence the Vice-Chairman presided over its meetings.

(3) The Act made obligatory the expenditure of two lakhs a year for drainage works and the improvement of bustees, and 3 lakhs for the improvement of the area newly added to the town.

It would be out of place in a work of this kind to attempt an estimate of the defects or merits of the new Act as exhibited in its working but the events which led to the amendment of this Act must be briefly stated.

On the 26th November 1896 the Lieutenant-Governor, Sir Alexander Mackenzie in laying the foundation-stone of the new drainage works at Entally, delivered the famous speech in which he reviewed and condemned the municipal administration of the past decade.

The immediate *fons et origo* of his action was no doubt the alarming report submitted on the 28th October 1896 by the five Sanitary Commissioners deputed by the Special Medical Board¹ to examine and report upon the

¹ Appointed by Government on 10th October 1896 (immediately after a case of bubonic plague had been reported from Howrah) for the purpose of deciding what steps should be taken to prevent and check the spread of plague in Bengal.

state of the Calcutta conservancy. In submitting a Bill for the amendment of the Act of 1888 to the Government of India the Local Government stated that in view of the facts set out in the sanitary report, 'the Lieutenant-Governor reluctantly came to the conclusion that the state of Calcutta from a sanitary point of view was so appallingly bad as to call for the early and effective intervention of Government, and that the first step necessary to bring about adequate reform was to revise the Act throughout, so as in the first place to provide the town with a responsible municipal Executive, and in the next place to furnish this Executive with a law adequate to the sanitary requirements of the present day and the condition of Calcutta as it now is.' No one who has read the report in question or the numerous reports submitted about the same time by Dr. Banks in his capacity of Chief Superintendent of Conservancy, will doubt the propriety of the epithet with which the Lieutenant-Governor branded the sanitary conditions of Calcutta, nor had he much difficulty in laying his finger on the weak points of the constitution which militated against an energetic administration. In the first place, the Corporation possessed 'an unlimited power of controlling the Chairman by the action of Committees,' and a liberal exercise of this power had undermined and sapped the strength of the Executive. In introducing the Bill of 1888, Sir Henry Harrison whose Liberalism could not be questioned, had described the elective Commissioners as 'the brake-power in the municipal train,' but while handsomely acknowledging the invaluable services which their advice and criticism had performed in the cause of economy and control he declared that the motive-power had been too weak and the brake too strong. It was the opinion of Sir Alexander Mackenzie that the 'motive-power' of the Executive had since 1888 steadily dwindled and that the 'brake-power' exercised by Committees¹ had grown correspondingly stronger. Moreover the committees had had their usefulness much

¹ In 1893 a Special Committee was appointed to select a site for a urinal in Waterloo Street.

impaired by the unwieldy dimensions to which they had grown, the Roads, Buildings, etc., Committee alone having forty-eight members. The result was that work tended at times to be suspended owing to the prolongation of discussion.

Secondly, some of the Commissioners themselves were of opinion that the bye-laws—in particular those relating to buildings—had been administered with misplaced generosity by some committees. Thirdly, the ‘normal action of the Executive’ was said to have been too freely interfered with at the expense of efficiency. Again, the conservancy, the collection of rates and certain branches of the accounts department were indubitably in an unsatisfactory condition, whether the blame was cast on the Executive or the Commissioners. Lastly, the European commercial community was said to be inadequately represented and—whether through its own indifference or not—to lack the influence to which it was entitled. On several of these points the Corporation in the elaborate *apologia* which they adopted in meeting on the 28th January 1897, joined issue with the Lieutenant-Governor, but the latter was convinced that radical remedies were called for and the amending Act (III. of 1899) came into force on the 1st of April of that year.

Act III. of 1899.—The Bill as originally framed left untouched the number of the Commissioners and the methods of electing and appointing but a very important change was introduced at the instance of the Government of India before the Act was placed upon the statute book.

The reduction of the number of Commissioners to 50 of whom 25 were to be elected at ward elections, the remainder being appointed partly by Government (15), partly by the Bengal Chamber of Commerce and the Calcutta Trades Association (4 each), and partly by the Port Commissioners (2), raised a storm of indignation, and some of the most influential Commissioners declined to engage in the administration of the new Act.

The Act provides for three co-ordinate municipal authorities—the Corporation, the General Committee, and the Chairman.

Their functions are precisely defined and carefully distinguished, all powers conferred by the Act being distributed amongst them with reference to their fitness to exercise such powers. Thus to the Corporation—in which, except as otherwise expressly provided in the Act, the municipal government is vested—are reserved the right of fixing the rates of taxation and all the general functions which a large deliberative body can efficiently perform. Subject to restrictions and conditions imposed by the Act, the entire executive power is vested in the Chairman, while a small working committee—the General Committee—has been interposed between him and the main body of Commissioners to deal with matters which are too important to be disposed of by the Chairman alone but are ill-suited for discussion by the Corporation. The number of the General Committee was reduced to twelve, appointed in equal proportions by (a) the elective Commissioners, (b) the Chamber of Commerce, the Trades Association, and the Port Commissioners, and (c) the Local Government. The life of the present Act has coincided with an epoch of municipal progress and expansion ; its provisions have controlled the execution of great and notable works and permitted the assumption of new responsibilities involved in the modern conception of municipal government.

During this period of progress, two features of the Act stand out with some prominence : (1) the important rôle of the General Committee, and (2) the heavy burden borne by the Chairman of the Corporation with his manifold executive duties and his position as Chairman of the Commissioners in meeting, President of the General Committee, and Chairman of the numerous standing and special committees. The latter circumstance and the omissions or defects in the drafting of the law which experience has brought to light, have once again placed the Act upon the anvil and before long Act III. of 1899 will give place to a more perfect measure.

CHAPTER II

PART I

DIRECTION AND MANAGEMENT

General.—An attempt was made in the previous chapter to sketch the growth of the municipal constitution, and it will have been seen that the early Justices were vested with powers not only to frame a policy but also actually to administer the affairs of the town. In practice, the town was administered by *one* of the Justices, known as the Chief Magistrate over whom Government however exercised a close control. By Act XVI. of 1847 the first Board of Commissioners was constituted, and the legislation of the next sixteen years defined and extended the powers of the new municipal authorities who now became responsible for the conservancy and works of improvement of the town, and later on for the assessment and collection of rates and taxes. Act VI. of 1863 created the offices of Chairman and Vice-Chairman who being vested with many of the powers previously exercised by the body corporate, formed the first responsible executive as distinguished from the controlling or deliberative authority. Since 1863 a further devolution of executive powers from the Corporation to the Chairman has been effected ; thus the following executive duties which are now performed by the Chairman or his delegated officers, were formerly carried out by the Justices, viz., the grant of licenses for trades and professions, for carriages and horses, for jute warehouses and offensive trades, the assessment of properties and the hearing of appeals against assessments, the remission of rates, and the exercise of coercive methods of collection.

Act III. of 1899 authorised the appointment of a third

officer called the Deputy Chairman; he and the Vice-Chairman are subordinate to the Chairman, but (in the words of the Act) 'subject to his general direction and control . . . have the same authority as the Chairman,' together with whom they constitute the directing and controlling staff of the Corporation.

Chairman.—Section 10 of the Act of 1863 made it lawful for the Chairman to hold also the post of Commissioner of Police for the town, and the offices were before long united in the person of Mr. V. H. Schalch. The Committee of 1885 appointed to consider the question of amalgamating the suburbs with the town, recommended the separation of the two posts, and effect was given to their recommendation by Act II. of 1888, when the Government of Bengal became responsible for all police charges. The Chairman is appointed by the Local Government 'which may at its discretion remove him from his office, and must do so if two-thirds of the Commissioners present at a special meeting have by resolution recommended such removal. Till 1899 the maximum salary of the Chairman was fixed at Rs3000 a month, exclusive of a house allowance. Section 12 of Act III. of 1899, however, empowered the Local Government to fix such salary as it thinks proper, but limited his house rent allowance to a maximum of Rs500 per mensem. The Chairman is the final authority in respect of the appointment, dismissal, privileges, and allowances of officers whose salaries do not exceed Rs300 per mensem, but in the case of officers in receipt of a salary of Rs100 or more per mensem an appeal against dismissal lies to the General Committee. The Chairman presides and has a casting vote at all meetings of the Corporation, the General Committee and all sub-committees of which he may be a member; he has certain powers in respect of expenditure and contracts, and as the chief Executive officer may at his discretion initiate any of the innumerable proceedings which are provided for in modern municipal acts to secure the better government of cities.

Vice-Chairman.—This office, as already stated, dates

from 1863. Attempts to economise by uniting the office, first in 1867 with that of the Health Officer, and again in 1879 with the Secretaryship, were unsuccessful, and it has been the custom, without however any legal sanction, to require in the Vice-Chairman a special knowledge of finance and an ability to control accounts. This custom was recognised by the old Town Council of 1879 and again in 1903-4, but the Municipal Act prescribes for the Vice-Chairman merely such powers and duties as the Chairman may delegate to him, and the title of 'controller of accounts,' by which the Vice-Chairman has in recent years been designated, possesses only the authority which custom and Section 112 of Act III. of 1899 has given it. The appointment is made by the Corporation, but is subject to the approval of the Local Government. The maximum salary payable to the Vice-Chairman was originally Rs1200 a month, but with the incorporation of the suburban area in 1888 this limit was raised to Rs1500 a month.

Deputy Chairman.—No specific duties are prescribed for this officer by the legislature. The appointment of such an officer and his selection are at the discretion of the Local Government which also fixes his salary, subject to a maximum of Rs1500 per mensem. The powers and duties of this officer are such as the Chairman may delegate to him.

SUPERVISION

From 1830 to 1847, when the first Board of Commissioners for the improvement of Calcutta was constituted, the supervision of conservancy, the repairs of roads and drains, and the lighting and watering of streets was in charge of an officer called the Superintendent of Roads and Conservancy; the assessment of taxes was made by Assessors appointed by the Magistrates in Session and controlled in practice by the Chief Magistrate; the collection of taxes was in the hands of the Superintendent of Police, who was appointed by Government.

Before 1847 and 1863 the activities of the municipality

took a wider range, and the appointment of new supervising officers became necessary.

During this period the supervising staff consisted of an Assessor, a Collector, a (Town) Clerk or Secretary, a Surveyor, an Accountant, and an Engineer. Between 1863 and the present day the superior supervision has been greatly strengthened and a brief account of these superior posts is necessary.

Secretary.—Act. XVI. of 1847 made no provision for the appointment of a Secretary or Town Clerk, and the Board of Commissioners feeling the need of such an officer, appointed a temporary clerk in 1848 pending the legislation of that year, which authorised the Board to make such an appointment subject to the approval of the Governor of Bengal, with whom also it rested to fix the salary of the post.

Act X. of 1852 attached the designation of Secretary to the post. His duties for many years were most varied ; it appeared to be the custom to thrust upon his shoulders all responsible work for which no special agency existed. In addition to his more legitimate duties as Clerk to the Commissioners or the Justices, he had responsible duties in connection with the municipal accounts ; he initiated legal proceedings by direction of the municipal authorities, and besides checking the work of the Collector, he exercised a general control over all the office establishments of the municipality. The rate or assessment Bills were prepared under his supervision, and he controlled the remission department. His present duties, less varied though no less onerous and exacting than those of his predecessors in office, are sufficiently connoted by his designation ; he is Secretary to the Corporation and the General Committee, and Personal Assistant to the Chairman ; he attends the meetings of these bodies and through his hands all important Corporation files pass on their way to the head of the Executive. The Secretary, whose salary is graded Rs800-1000 a month, has since 1909 been aided by a responsible Assistant Secretary.

Assessor and Surveyor.—The first assessment of the town was made in 1795 by a Mr. Mackay ; in 1809 there

was a new assessment, and in 1819 the town was again assessed by four *surveyors* under the superintendence of the Assessor. Before 1840 the assessors were appointed by the Magistrates in Session; the office, however, was not expressly sanctioned by the statute of 1793, and was first legally recognised by Act XXIV. of 1840, which authorised the Governor of Bengal to appoint one or more assessors.

In 1847 there were two assessors, each in charge of two of the four administrative divisions of the town. Their chief duty was to value all properties in the town for the assessment of rates. They were apparently not whole-time officers and carried on other avocations of their own. In 1848 one assessor was appointed for the whole town on Rs400 a month, and about the same time a new officer called the Surveyor, was appointed by the Commissioners under Act II. of 1848 on a salary of Rs600 a month. His duties were somewhat analogous with those of officers of the same designation appointed in England under statute 7 Geo. III. c. 42; thus he was required to supervise the cleaning, repairing, lighting, and watering of roads and streets, and the repairing and cleansing of drains.

In 1863 the offices of Surveyor and Assessor were amalgamated, the duties of the new post being limited to the assessment of properties and the execution of surveys required for the preparation of plans and estimates in connection with the general works of improvement of the town.

In 1909 a Deputy Surveyor was appointed to relieve the Assessor and Surveyor of much of the detailed work of surveys and estimates which had swelled to an enormous extent owing to the extensive drainage works and other improvements involving land acquisition on a large scale.

In 1913 the post of City Architect was revived and with it was amalgamated the office of Surveyor. He is assisted by a Deputy Surveyor on a pay of Rs300-400 a month.

The duties of the Assessor, who draws a salary of Rs600

a month, and who is assisted by a Deputy Assessor, are now restricted to the valuation of properties for the assessment of rates upon them and for their acquisition or sale.

Collector.—This office, formerly filled *ex officio* by the Superintendent of Police whose post was analogous to that of the Commissioner of Police of the present day, was made subordinate to the Board of Commissioners by Act XXIV. of 1840, under the conditions and terms attached to the office of Assessor.

In 1848 Babu Dakshinaram Mukerji was appointed on a monthly salary of Rs400 ; he was required to give security of Rs30,000, and to collect the carriage and horse tax as well as the house-rate. He was allowed a commission of Rs1.8.0 per cent. on all collections made with the issue of a summons. Subsequently this commission was raised to $3\frac{1}{2}$ per cent. on the house-rate and 7 per cent. on the carriage and horse tax, on the understanding that the collector would receive *no fixed salary* and would defray the whole cost of his clerical and accounts establishment.

In 1863 his security was increased to Rs50,000, and his emoluments became a commission of $2\frac{1}{2}$ per cent. on the amount of house and lighting rate collected, the payment of the carriage and horse and hackery taxes direct into the municipal treasury having been made compulsory.

In 1874 the agreement with the Collector was revised, and a commission of $1\frac{1}{2}$ per cent. on his collection of all rates was sanctioned. The system of collection by commission did not however work well, and two collectors on fixed salaries of Rs300 a month were appointed.

In 1878 grave irregularities in this department came to light and a special committee having investigated its working, the old system of paying the Collector a commission on all realisations, except on account of the Imperial license tax and cart registration fees, was reverted to.

The bills realisable by the Collector comprised house, water, lighting, and police rates, night-soil fees, notice of demand and warrant fees, and certain miscellaneous receipts.

After 1888 a joint-collector for the added area was appointed ; he was allowed a commission of $1\frac{1}{2}$ per cent. on his collections and was required to furnish a security of Rs20,000.

In 1893-94 the rates of commission for the collector and joint-collector were reduced to Rs $1\frac{1}{4}$ and Rs $1\frac{3}{8}$ per cent. respectively, and in 1900-1 were again reduced to $1\frac{1}{8}$ and $1\frac{5}{8}$ per cent. respectively.

In 1901-2 the services of the collector and joint-collector were dispensed with, and a new collector appointed on a fixed salary of Rs750-1000 a month ; the advantages of the commission system were preserved by the grant of a bonus of Rs100 a month on every 1 per cent. of collections *in excess of 95 per cent.* of the demand. The security was fixed at one lakh. Since 1909-10 the Collector has been given the services of a responsible Assistant Collector.

The bonus system the value of which has been amply demonstrated, has been recently further developed and improved.

Treasurer.—Before 1878 the Collector was also Treasurer, and was responsible for the safe custody of his collections until deposited in the Bank of Bengal. In that year the two offices were separated ; the Treasurer at present receives a pay of Rs300-400, and is required to furnish a security of Rs50,000.

License Officer.—Before 1863 all taxes, as well as rates, were realised by the Collector ; during the period 1863-65 the Assessor-Surveyor with two assistants performed the duties of the licensing officer ; and in 1866 the post of License Officer was made a separate appointment.

Since 1898-99 his duties have been confined to the collection of (1) taxes on trades, professions, carriages and horses, (2) the scavenging tax, (3) fees levied on offensive and dangerous trades, (4) market fees, and (5) cart registration fees.

He is assisted by two Deputy License Officers, each on a pay of Rs300-400 a month, one of whom is solely employed on the realisation of cart registration fees.

The License Officer, whose salary is now Rs400-600

a month, was first made a statutory officer by Act III of 1899.

Engineer.—Before 1855 no original works of importance were executed by the Municipality.¹

On the resignation of the Secretary, Mr. Beckett, in 1854, the Commissioners took the opportunity of appointing to this office Mr. Clark, an engineer of high reputation, who was at the time employed by the E.I. Railway Company.

In 1857 Mr. Clark became the first engineer to the Municipality on a salary of Rs1500 a month.²

In 1864 a Drainage Executive Engineer was appointed, and in 1867 an executive engineer was placed in charge of the water supply—two offices which have been continued up to the present time.

There have been several minor alterations from time to time in the duties of the Engineer, but the most radical change in organisation took place in 1901-2, when, on the recommendation of a special committee, the engineering department was decentralised by the creation of four fully equipped administrative units, called districts. Each district is in charge of a responsible engineer, under the general control and supervision of the engineer appointed under Section 63 of Act III. of 1899 and designated the Chief Engineer.

The salary of the Chief Engineer is at present Rs2500 per mensem, while the District Engineers who are provided with free quarters, are placed in the grade of Rs500-750 a month. The salaries of the Executive Engineers of Waterworks and Drainage are respectively Rs1000 and Rs1200 a month.

Health Officer.—The appointment of the first Health Officer (Dr. Fabre Tonnerre) in 1864, under Section 28 of Act VI. of 1863, is perhaps one of the clearest signs of

¹ The Lottery Committee was not strictly a municipal body.

² In 1863 he was sent on deputation to England to study the London metropolitan drainage and waterworks; Mr. W. Smith, Superintending Engineer, in 1865 was appointed to carry out Clark's water supply scheme, and was also sent on deputation to England. In 1870 Clark took over charge of the waterworks, and remained in charge of these works and the drainage works until he resigned in 1873, Mr. Bradford Leslie being appointed to succeed him.

the new era of municipal activity which that Act brought in, but this advance towards the modern conception of municipalism was not achieved without difficulties and backslidings. The salary in 1864 was fixed at Rs1600 a month. In 1875 there was some idea of appointing a consulting Health Officer, or of appointing a qualified medical officer as Vice-Chairman. This scheme was not approved, but the Justices in view of the fact that the Road and Conservancy Departments had been made over recently to the Engineer, decided to reduce the salary of the Health Officer and to allow him to engage in such private practice as would not interfere with his official duties. Dr. Tonnerre was got rid of by the payment of a solatium of Rs35,000, and Dr. A. J. Payne appointed on a salary of Rs1000 a month. In 1880 Dr. K. M'Leod, a Government officer, was appointed to perform the duties of Health Officer in addition to his own on a salary of Rs700 a month, and this arrangement was continued until 1886, when Dr. W. J. Simpson was appointed as the second whole-time Health Officer of Calcutta. The importance of this post in a modern city is now recognised, and since the reorganisation of 1901-2 the Health Officer who draws a salary in the grade of Rs1500-2000, has been assisted by four District Health Officers.

Chief Accountant.—During the regime of the Improvement Commissioners, i.e. 1847-1863, the accounts of the municipality were supervised by an accountant on a pay of Rs150 a month, who was under the general control of the Secretary or Clerk. The advisability of employing a more responsible and experienced officer was from time to time considered, but it was not until 1904 that a Chief Accountant on an adequate salary (Rs1000-1250 a month) was appointed.

Solicitor.—The legal work of the municipality in its infancy was probably inconsiderable both in amount and importance, but in 1851 we learn that Mr. Thomas, of Messrs. Allan and Thomas, was made attorney to the Board of Commissioners, and in 1855 the proceedings in connection with the acquisition of land for the Halliday Street scheme necessitated the employment of solicitors.

Legal advice and aid were obtained as required from time to time, and it was not until 1903 that any contract for such services was entered into. In that year Messrs. Sanderson and Co. were appointed solicitors to the Corporation with a fixed annual fee of Rs30,000 for all regular legal work in the different subordinate courts, and in addition the ordinary solicitor's fees for all other services, including High Court work, opinions, conveyancing, etc. In 1904-5 the total charges amounted to over Rs70,000, and the Commissioners decided that it would be more economical to create a separate law department of the Corporation in charge of an experienced solicitor.

In 1905 Babu Manilal Sen, B.L., was placed in charge of the new department on a salary of Rs1250 a month. It is generally agreed that the experiment has more than justified itself, and in 1910 the Corporation sanctioned the continuance of these arrangements for another ten years.

Superintendent of Lighting.—Until 1910 the lighting of the town was carried out entirely by a private company, which supplied not only the illuminant (gas) but also the lanterns, posts, and other accessories, as well as the labour for lighting and extinguishing the lamps. In 1910 a new contract was executed with the company, under which the Corporation assumed direct management of the lighting of the city, the illuminant alone being supplied by the contractors. A separate lighting department was created, in charge of a superintendent, Mr. E. V. Eastwell being first appointed to this office in 1910 on a salary of Rs500-750.

City Architect.—The need for Building Regulations in Calcutta was urged with much force by the Health Officer in 1886, and in 1889 bye-laws—somewhat unsatisfactory and inadequate—were framed. For the next ten years the matter was constantly pressed upon the attention of the Corporation by the Health Officer, but the Commissioners were averse to any drastic interference with building operations, and new bye-laws were not framed until after Act III. of 1899 had been passed.

In 1903 the first City Architect and Building Surveyor

(Mr. H. T. Bromley) was appointed. This post was, however, abolished in 1907, and the work in each district was placed under the District Engineer. It was, however, found that the District Engineers were able to exercise only a nominal supervision over the Building Surveyors who were much better conversant with the new and somewhat elaborate bye-laws, and the Deputy Chairman was subsequently placed in charge of the department.

In 1913-14 it was considered advisable to obtain the services of an architect with experience in municipal work, and the post of City Architect with a salary* of Rs1350 a month was revived. The duties of Surveyor, previously performed by the Assessor, were combined with this office.

Market Superintendent.—This office dates from the foundation of the Municipal Market in 1874. The Superintendent was originally under the direct control of the Health Officer, but in recent years the Deputy Chairman has exercised a general supervision over his work. The Superintendent who draws a salary of Rs400-600 a month with free quarters, is in charge of the Sir Stuart Hogg and the Lansdowne Markets; a separate Superintendent on smaller pay is at present in charge of the Sir Charles Allen Market.

PART II

DEPARTMENTS—THEIR FUNCTIONS AND ORGANISATION

Assessment Department.—Some attempt to organise a municipal fund by the levy of a house-rate seems to have been made in 1781, but it was statute 33 Geo. III. c. 52 which first legally authorised the assessment of rates by the Justices of the Peace at their General and Quarter Sessions. The assessment was not to exceed 5 per cent. on the gross annual value of the houses, buildings, and ground in the town, except in the case of urgent necessity, when the Governor-General in Council might authorise a

further assessment to the extent of $2\frac{1}{2}$ per cent. The arrangements authorised by this statute were in force from 1794—when the first assessment¹ was made—up to 1840. During this period the Chief Magistrate exercised a general control over the Assessment Department. Appeals against the assessment were heard by the Justices in Sessions, ‘the Chief Magistrate making such preliminary inquiries and arrangements’ as were ‘calculated to abridge their task.’²

Act XXIV. of 1840, with its abortive scheme for entrusting the assessment of properties on certain conditions to the ratepayers themselves, authorised the appointment of an assessor who even after the constitution of the Board of Commissioners by Act XVI. of 1847 remained subordinate to the Justices.

Act X. of 1852 transferred to the Commissioners all responsibility for the levy and collection of the house-rate, and in the result enhanced the importance of the post of assessor. Between 1840 and 1863 new assessments were made either quarterly or annually, but the currency of assessments was under Act VI. of the latter year increased to a period of three years, and again extended to six years under Act IV. of 1876.

It was the Act of 1876 which first permitted appeals against assessments—previously³ preferred to a Board consisting of not less than three Justices—to be lodged in the Court of Small Causes.

Principle of Assessment.—Mr. Mackay made his assessment in 1795 by taking 6 per cent. of the estimated capital value of a house and its grounds as the fair *annual value* of the property, irrespective of whether such property were rented or occupied by its owner. This principle essentially was followed until the enactment of Act II. of 1888, under which the annual value of

¹ A provisional assessment was made in 1794 by four temporary assessors; the first regular assessment was made by Mr. Mackay in 1795. Two other assessments were made prior to 1840—one in 1809 and the other in 1819, both being largely based upon the labours of Mr. Mackay.

² Government Resolution No. 40, dated 30th November 1830.*

³ Act VI. of 1863 first definitely constituted these Appeal Benches. Before 1863 appeals were heard nominally by all the Justices.

'residential' properties, *i.e.* those occupied by their owners, was taken as 5 per cent. of the estimated present cost of the building, plus the value of the land, while for land and buildings *erected for letting purposes, or ordinarily let*, the annual value on which the rates were calculated was deemed to be the gross annual rent from year to year, or the average letting value of the property. This Act also first laid down a definite principle for valuing huts in bustees or elsewhere: the present law on the subject is contained in Section 151 of Act III. of 1899.

Organisation and Procedure.—In 1840 the total cost of making the assessment was Rs9500 a year; in 1913-14 it amounted to Rs98,542. The division of the town into eighteen wards under Act IV. of 1876 involved the preparation of new assessment registers—101 volumes in the first instance and 34 volumes added subsequently, in view of the assessments on bustee tenants' holdings being divided so as to show the assessment separately on each tiled hut and the land it occupied—and the employment of extra staff sent up the cost of establishment in 1877 to Rs18,000. In 1880 the Bill Department came into being; the system under which the Collector had prepared his own bills was exposed to obvious abuses, and gave way to the present practice under which bills are prepared, registered, and signed by the Assessor before delivery to the Collector, and the annual cost of establishment rose to Rs22,000. The incorporation of the suburbs in the Municipality in 1888 imposed heavy pressure on the department, and the necessary increase of staff brought its cost up to Rs38,000.

In 1901 some changes in organisation were introduced on the recommendation of a special sub-committee, four sub-assessors, one for each district, being appointed to make annual or 'intermediate' assessments.¹ Two vacant-house inspectors were also appointed.² In 1913-14

¹ *I.e.* Valuations made on account of new buildings and improvements between general revisions.

² In 1837 the Fever Hospital Committee noted that the practice of remitting taxes on buildings or land, on the ground of being vacant or not occupied, which had sprung up some time previously, was illegal, and not authorised by the statute of 1793.

some important changes in organisation were effected at a small increased cost, with the object of utilising more effectually the services of the superior outdoor staff. For a detailed account of the working of this important Department, the reader is referred to the valuable departmental handbook prepared under the supervision of the Deputy Chairman in 1907-8.

Appeals.—Objections against the assessments fixed by the Department may be lodged at the Municipal Office; they are investigated in the presence of the objectors by the Vice-Chairman or the Deputy Chairman, who are authorised in this behalf by the Chairman in regard to assessments made in the northern or southern division respectively. Appeals from the orders passed by these offices lie to the Court of Small Causes. In 1793 twenty-one petitions of objection were preferred against Mackay's assessment.

In 1833, when there was a slump in property values in Calcutta, we find that 2500 petitions were presented to the Magistrates in Sessions, but for many years the percentage of appeals continued to be extremely low.

In 1908-9 the Government of Bengal accepted the proposal of the Corporation to reduce the fee leviable by the Small Cause Court on appeals preferred against the assessment, with the result that in 1909-10 the number of such appeals was 135 as against 7 in the preceding year.

In 1914 there were 9508 buildings or lands revalued; the assessment was enhanced in 8680 cases, in 5681 of which objections were received at the Municipal Office.

Three thousand seven hundred and forty-two cases were disposed of in the year, the valuations being modified in respect of 1791 properties, *i.e.* 48 per cent.; in 77 per cent. of the objections, appeals were lodged in the Small Cause Court.

Valuation.—In 1858 we find the Commissioners expressing much gratification at the rapid development of the city. In that year the annual valuation of the town was assessed at Rs66,53,513; on the 31st March 1914 it stood at Rs4,14,65606, while the revaluations

for this year (1913-14) resulted in an increase of 27 lakhs—the highest on record. By the 31st March 1915 there had been a further increase of $19\frac{1}{2}$ lakhs, and the total valuation of the city now stands at Rs434 lakhs.

The following Table shows the valuation of the city for each quinquennial period since 1880 :—

Year.	Valuation.
1880	Rs1,31,77,293
1885	1,41,32,130
1890	1,73,70,515 ¹
1895	1,98,41,008
1900	2,19,49,992
1905	2,63,02,321
1910	3,33,81,056
1915	4,34,00,000

COLLECTION DEPARTMENT

General.—Under the statute of 1793 the ‘Collector of Assessment’ was appointed by the Justices in Sessions, but the duties of the post appear to have been very inefficiently performed.

The house-tax assessment for 1829-30 amounted to Rs3,19,320, but the amount collected was only Rs2,43,220, and the outstanding arrears at the close of this year were Rs2,95,114. The Police Commission of 1830 drew attention to the subject and Government by its order of 12th October 1830 attached the duty of collecting the assessment to the office of Superintendent of Police for Calcutta,² who in this, as in all other respects, acted under the general control of the Chief Magistrate. The Superintendent drew a salary of Rs500 a month on account of his police duties and a commission of $2\frac{1}{2}$ per cent. on

¹ Valuation of added area Rs27,03,338 is included.

² This post was formerly held by the Chief Magistrate, but subsequently fell into abeyance. The post was created as a separate office by the order of 1830.

the gross amount of his collections. He had under him seven sirkars, who divided amongst them $1\frac{1}{2}$ per cent. of their collections. The quarterly assessment bills were made out in the Collector's office from a copy of the Assessor's books received from the Clerk of the Peace. The sirkars' accounts were balanced quarterly, but as might be supposed the stocktaking of the bills appears to have been made in a very perfunctory and careless manner, and no systematic efforts appear to have been made to realise long-standing arrears—ten or twelve quarterly payments being frequently due before compulsory process was resorted to.

In spite of the Hospital Commission's prudent warnings on this subject, these defects in collection continued to affect the municipal revenues, until in 1866 arrears of over 2 lakhs led to the appointment of a committee to inquire into the working of the department. It was decided that the Collector should be allowed the whole of one quarter to collect the bills of the previous quarter ; during these three months he was to present every bill for payment, and at the end of the period to close and balance his accounts. Commission was to be given on all amounts paid during the quarter, while outstanding bills were to be handed over to a new and separate department, termed the Warrant Department, for realisation by coercive processes.

Warrant Department.—The notice of demand and warrant fees which the bailiff had hitherto been allowed to retain, were henceforth credited to the general account, the bailiffs receiving a consolidated pay. These fees proved sufficient to cover the cost of establishment and the commission granted to the bailiffs.

The Vice-Chairman was placed in charge of this Department, and by the following year nearly $1\frac{1}{2}$ lakhs of the arrears had been realised, the balance being written off as irrecoverable.

Changes in System and Procedure.—Ratepayers however complained that through the negligence or malice of the sirkars, bills were frequently transferred to the coercive branch without having been first presented for

voluntary payment; the sirkars were paid by the Collector, and were therefore not subject to the direct control of the Chairman.

In 1876 two salaried collectors were appointed in place of the Collector who had been paid by commission, and were given an establishment of bailiffs paid direct by the Municipality.

In 1878 an embezzlement of Rs2000 by a sirkar led to the appointment of a special committee which took in hand the reorganisation of the whole department. It was decided to revert to the former system of paying the Collector a commission on all collections (except the Imperial license tax and cart registration fees); he was however to entertain such establishment as the Chairman should approve, while his staff was to be subject to dismissal or other punishment by the Chairman.

The Collector was required to realise house, lighting, water, and police rates, night-soil fees, process fees, and other miscellaneous fees. Bills for rates and night-soil fees were prepared in the newly created Bill Department immediately *before* the quarter in which the rates became due, and after being attested by the Assessor were made over to the Collector, who was allowed the whole of the ensuing quarter and seven days of the next quarter for realising the revenue by voluntary methods.

On the seventh day all unrealised bills were returned by him, those which were clearly recoverable being transferred to the Warrant Department, and others being inquired into by the Vice-Chairman and Assessor.

The house-rate was not yet made payable at the *beginning* of the quarter for which it was due, but as the landlord was liable for this rate, there was generally speaking no great difficulty in realising it. The water, police, and lighting rates were collected on one bill from the tenant. They were payable in advance, but owing to changes in tenancy a great many bills had to be returned to the Assessor for correction, a large proportion of which had finally to be cancelled. In 1881, on the suggestion of Dr. Rajendralal Mitra, a Commissioner, the system of counterfoil bill books was first introduced,

with the result that the check on the bailiffs was made more efficient and simple.

Arrear Department.—In the same year the Assessor was placed in charge of a small collecting staff, with authority to realise the old arrears of the Warrant Department. This Arrear Branch, as it was called, was not abolished until 1897, when the Warrant Department was strengthened by the appointment of an assistant superintendent, three inspectors, and a large number of bailiffs. Efforts were made to realise the old arrears by a temporary staff.

The Inquiry of 1900-1.—In 1900-1 grave irregularities were discovered in the Warrant Department. The bailiffs' accounts had not been properly kept, the outstanding demand of the department was unknown, the registers had not been written up since 1894, cancellations and realisations had not been regularly posted, paid and unpaid bills were mixed together in confused bundles, bills which had never been inquired into, and covering an amount of 3½ lakhs—much of it time-barred—lay in the office, and lastly, bills for different wards, different premises, different rates, and different quarters were mixed together in inextricable confusion. During the course of the year some order was evolved out of the muddle, and the reformed department proceeded to work on a demand reduced after inquiry and wholesale cancellation to Rs4,86,331. Of this amount, Rs43,340 was realised by voluntary payments or by means of suits, while further cancellations to the extent of Rs2,20,961 were made. The Warrant Department was abolished on the 1st April 1902, and its bills, amounting to Rs2,22,020, were transferred to a new department.

Suit Department.—The Suit Department which consisted of a superintendent and a small staff, was at first placed directly under the Collector, but on the creation of a Law Department in 1905 it was made subordinate to the Solicitor. The realisation of the old arrears which it inherited from the Warrant Department, still proceeds; from time to time amounts which there is no possibility of realising are cancelled with the approval of the Cor-

poration, but the Suit Department has nevertheless shown both energy and ability in making the best of the *damnosa hereditas* bequeathed to it by the Warrant Department.

Reorganisation of Collection Department.—The inefficiency which the examination of the Warrant Department had disclosed, led to the overhauling of the whole Collection Department. A salaried collector on a pay of Rs750-1000, exclusive of a commission on realisations, was appointed. He was given a staff on fixed salaries, plus an annual bonus, and given a clean slate by the transfer of all arrears outstanding on the 31st March 1901 to the Warrant Department, which was not abolished until 1902. The new Collector was required to deal with all demands accruing after that date, and under Act III. of 1899 he was given coercive powers, which his predecessors had not exercised.

The superior staff of the *outdoor* establishment consisted of eight inspectors, each in charge of a *division*—the administrative unit for collection purposes. Under them were one hundred bailiffs, who performed the actual work of house-to-house collection.

In 1907-8 an inspector was added to the staff for the realisation of *hazuri* bills, that is, bills payable by large proprietors who apply to have their rate bills for different properties presented to them together. Arrangements are also made for *office* collections. As early as 1837 we find the Fever Hospital Committee considering a proposal to make ratepayers responsible for depositing their rates in the Municipal Office, but such an obligation which is submitted to without demur in the west, has never become a part of the municipal system in eastern cities.

Bonus on Collections.—It was recognised that a bonus on results would provide a valuable incentive to efficiency, and in 1901 it was decided to pay the Collector a bonus at the rate of Rs100 per month on every 1 per cent. by which the collections for any year exceeded 95 per cent. of the gross demand; the inspectors and bailiffs were paid a similar bonus at the rate of Rs16 and Rs5 per month respectively. Subsequently, from various causes, the remissions for vacancy increased and swelled the

irrecoverable demand ; they were, however, included in the gross demand debited against the Collector, and in 1909-10, when the highest percentage on record of the recoverable demand was attained, the bonus earned touched its lowest point. In 1911 this anomaly was rectified by reducing the assumed satisfactory minimum percentage from 95 per cent. to 94·5 per cent., and more recently the bonus system has been further modified and improved.

It is now generally agreed that there is no more efficient department in the Corporation than that managed by the Collector—a fact which is the more satisfactory in view of its known defects and numerous reorganisations during the last century. On the 1st April 1913, the gross demand on account of the consolidated rate stood at Rs76,97,647, and Rs6,33,262 on account of miscellaneous bills ; by the 31st March 1914, 96·05 per cent. of this demand had been realised, or 99·75 per cent. of the *net demand*, that is after elimination of the demand cancelled for vacancy, referred to the Assessor at the close of the year for amendment or transferred to the Law Department for the institution of suits.

Manual.—In 1907-8 a most useful Manual which prescribes in the minutest detail the procedure authorised in this department, was compiled under the supervision of the Deputy Chairman. In 1905-6 a serious defalcation of Rs15,338¹ by a clerk had established the necessity of an efficient audit of bills by the Accounts Department, and provision for this audit is made in the Manual.

Cost of the Department.—In 1835-36 the net collections on account of the house-rate amounted to Sa.Rs2,24,543 ; the cost of the department was Sa.Rs27,343, *i.e.* 12·1 per cent. In 1847 the amount realised by the Collector was nearly 3 lakhs, and it was collected at a cost of Rs17,000—a percentage of 5·6.

¹ Of this amount, Rs13,656 was made good by the Collector and the balance by some of the bailiff.

In 1852 the corresponding figures were $3\frac{1}{3}$ lakhs, Rs19,000, and 5·7 per cent. respectively.

In 1862 the collections had increased to 7·88 lakhs, out of which the Collector received as commission Rs29,000, i.e. about $3\frac{1}{2}$ per cent.

In 1865 the collection of the trades and professions and the carriage and horse taxes was made over to another officer, and the Collector's realisations amounted to Rs8,80,000, of which he received Rs23,000, or $2\frac{1}{2}$ per cent. as commission.

The following statement shows the corresponding figures of later years :—

Year.	Collections.	Cost of Collection.	Percentage.
1876 . .	17,18,000	45,000	2·6
1881 . .	16,22,000	39,000	2·4
1889-90 . .	31,67,000	45,000	1·4
1901-2 . .	45,62,000	1,72,000 ¹	3·7
1910-11 . .	62,20,000	1,14,000	1·8
1913-14 . .	83,30,000	1,60,000	1·9

ACCOUNTS DEPARTMENT

The Fever Hospital Committee were not favourably impressed with the accounts system in 1836-40. In 1848 it consisted of an Accountant on Rs150 a month and three clerks, the establishment being under the general supervision of the Clerk (or Secretary).

In 1857 we find the Accountant drawing a pay of Rs250 a month, while his three assistants together cost Rs86 a month. In 1870 an Assistant Accountant on a monthly pay of Rs150 was appointed, and later on a separate branch with an assistant drawing Rs100 a month was created to deal with municipal debentures. For about thirty years the Department stagnated, but in 1898 the Vice-Chairman, Babu Nilambor Mukherji, C.I.E., submitted definite proposals for reform. His scheme was carefully considered, and in 1900 Mr. U. L. Mazumdar,

¹ Includes cost of Warrant Department.

an officer of the Finance Department of the Government of India, was deputed to the Corporation to examine the existing system of accounts and to advise the authorities for its reform. His exhaustive Report of 1901 had scarcely been considered, when the Lieutenant-Governor¹ offered to depute a Public Works Accounts officer of standing and experience to examine the system and draw up a set of simple rules for the guidance of the Department. Mr. W. F. Barrow was selected for the task and in his report he recommended that radical changes in the forms, procedure, and system of the Department should be introduced. His proposals were substantially adopted in 1903, but in 1904 it was discovered that his scheme not only possessed some intrinsic defects but was in some points in contravention of the provisions of the Act.

The Corporation finally authorised the Chairman to reorganise the Department. The late Sir Charles Allen set about the task with characteristic energy, and was responsible for introducing a series of important and beneficial changes.

On his recommendation a Chief Accountant on a pay of Rs1000-1250, a Test Auditor (on Rs150-200), a Travelling Auditor (on Rs300-400), and additional clerks on adequate scales of pay were appointed; the account rules were codified, an efficient store audit and a detailed audit of income were introduced, an annual stocktaking of stores was instituted, and the monthly closing of accounts and the preparation of the monthly progress statement of receipts and expenditure was ordered. In these important reforms, which cost about Rs25,000 a year, Sir Charles Allen received able assistance from the first Chief Accountant, Mr. W. H. Rogers Ford, A.C.A., and their joint efforts laid the foundation of the vigilant and well-organised Department of the present day. The Department was divided into five sections, each in charge of a Head Assistant on Rs75-150, viz.:—

¹ The Lieutenant-Governor's attention was drawn to defects in the procedure and system of the Accounts Department by the Honourable Mr. R. B. Buckley, who acted as arbitrator in a dispute between the Corporation and some contractors.

- I. Book and Compilation section.
- II. Audit of Disbursements and Budget section.
- III. Audit of Receipts section.
- IV. Audit of Stores section.
- V. Correspondence and Record section.

The Chief Accountant is assisted by an Accountant on Rs200-250, and attached to each district and other considerable subordinate office is a small accounts staff, immediately subordinate to the local executive officers, but ultimately responsible to the Chief Accountant.

HEALTH DEPARTMENT

The post of Health Officer dates from 1863; the Inspector of Markets acted as his general assistant, and in 1864 six Registrars of Births and Deaths were appointed. The Health Officer's most important function was the supervision of surface conservancy and for this purpose he exercised a general control over the Superintendent of Roads.

The transfer of conservancy to the Engineer's charge in 1878, its retransfer to the Health Office in 1887, and again the revocation of this system in 1901-2, since when the Engineer has been solely responsible for this important branch of municipal work, will be referred to in the chapter dealing with conservancy,¹ and it is unnecessary here again to trace in detail these changes of system. It will, however, be convenient to describe briefly the development of the Department since 1886, when Dr. Simpson was appointed as whole-time Health Officer.

Organisation of Health Department in 1886-87.—The Health Officer who was given the services of an Assistant Health Officer with medical qualifications and two Superintendents of Conservancy, divided his establishment into three branches :—

- (1) Conservancy, dealing with the surface-cleansing of the town and the removal and disposal of the night-soil.

¹ *Vide* also section 'Engineer's Department' *infra*.

- (2) Nuisances, devoted mainly to inspection work, with the duty of having sanitary abuses ¹ remedied by warning notices or prosecutions.
- (3) Medical, dealing with registration of births and deaths, vital statistics, food inspection, laboratory work, inquiries into all cases of infectious disease, etc.

During the next fifteen years there was much activity shown by the Department, but the results were unsatisfactory. The Health Officer complained that his staff was² inadequate, and it is clear that the Sanitary or Nuisance Inspector could not supervise the conservancy of his ward and at the same time devote himself systematically to the abatement of nuisances, nor was it economical to employ the medical inspectors in the actual disinfection of premises.

Reorganisation of 1901-2.—Dr. Simpson, while repudiating ‘the general impression that the duties of a Health Officer mainly consist in perambulating the town in search of unpleasant smells,’ had nevertheless protested against the proposal to transfer the conservancy branch to the Engineer. There can however be no doubt that this change, which was made in 1901-2, has produced a more efficient conservancy without impairing the Health Officer’s status as expert adviser to the Corporation on all matters pertaining to the public health, whether it be in relation to drainage, ventilation, removal of nuisances, or the prevention of disease. This change was accompanied by the appointment of four district health officers, who in addition to their medical qualifications were required to possess a knowledge of sanitation. The post of assistant health officer was abolished, and the post of head assistant was created for the supervision of the heavy clerical work of the Department. Fifteen sanitary inspectors ² and four food inspectors were appointed.

¹ In connection e.g. with offensive trades, defective house-drainage, insanitary privies, etc., etc.

² In 1908 the experiment of appointing a female sanitary inspector was made, and the experiment was a success; the present Health Visitor, as she is now designated, is a qualified lady doctor, and in 1913-14 visited 3443 houses in which over 9000 families resided.

The Health Department as now organised, follows substantially the lines laid down in 1901-2. A brief reference to its most important functions, which, first assumed by Dr. Payne, have since been co-ordinated and defined, may now be made, the reader being referred for a more complete account to the chapter on Public Health.

Analytical Work.—Prior to 1886 an officer of Government was responsible for making an analysis of water and gas, but in that year Dr. Simpson, having been appointed as a whole-time Health Officer, was required to take over these duties. He equipped a small laboratory, and an analyst, who was also to act as his personal assistant, was appointed temporarily on a pay of Rs150 a month; a laboratory assistant, subsequently designated Assistant Analyst, was also appointed. In 1888 the Corporation sanctioned the appointment of a more highly qualified analyst, by whom the analysis of articles of food and drink exposed for sale was first undertaken.

In 1896 we find two medical men, specially trained in analytical chemistry and bacteriology, working in the laboratory; in addition to the weekly analysis of the river water at Pulta, the water of the settling-tanks and the filtered water supplied to the town, and a weekly examination of the gas supply, they analysed samples of water taken from tanks and wells by the medical inspectors, analysed and examined articles of food seized by food inspectors, and conducted the bacteriological examination of water and milk, in connection with cholera.

In 1908-9 an additional analyst was appointed, and increased activity was shown in safeguarding the purity of the food supply.

In 1913-14, in addition to the chemical analysis and bacteriological examination of water, an elaborate examination of the air in the city sewers was made with reassuring results, and 240 samples of larvæ collected in different mosquito-breeding grounds were examined and identified. One thousand seven hundred and twenty-eight samples of food-stuffs were analysed; the fines realised from 589 prosecutions amounted to Rs17,567.

Plague Preventive Measures.—Calcutta had its first plague scare in 1896, and energetic steps were taken to meet the new danger. In 1898 more drastic and elaborate measures were taken, and a separate Plague Department was created.

Before long, however, the policy of the Government of India changed, expert opinion gradually inclining to the view that the plague could be best fought by a general improvement in hygiene. The operations of the Department were therefore soon confined to an inquiry into the cause of death, medical attendance on plague patients, disinfection of houses, inoculation, and the destruction of rats.

In 1907 it was realised that the work of the Health and Plague Departments overlapped, and after considerable discussion it was decided in May 1908 to amalgamate the two departments. The subordinate plague establishment was absorbed in the Health Department, and the Health Officer was given the services of a qualified medical officer for two years on a pay of Rs750, to assist him in the supervision of plague measures and generally in his other duties. The medical inspectors of the Plague Department were utilised for collecting the data on which the mortality statistics are based, while the disinfecting inspectors took over the duties connoted by their name, which had formerly occupied too much of the sanitary inspectors' time.

It is now the practice to appoint each year additional medical and disinfecting inspectors just prior to and during the cold season, in which outbreaks of plague appear. Special bustee-cleaning gangs are also engaged to remove the filth and garbage which tends to accumulate in the interior of bustees.

In 1913-14, no less than 186,347 rats were brought to the three municipal rat-depots; Rs5824 was disbursed in rewards. 21,473 cases were investigated by the medical inspectors, and 7259 disinfections were carried out by the inspectors in charge of this work.

Abatement of Nuisances.—There are 19 sanitary inspectors, who in 1913-14 dealt with 8370 sanitary im-

provement cases ; in 5144 cases the work was completed or taken in hand.

The Municipal Act contains numerous provisions empowering the Corporation to insist on private persons effecting such sanitary improvements in their properties as may be thought necessary, but it cannot be said that the Health Department has hitherto been very systematic in its attempts to utilise these provisions, or very successful in overcoming the inertia and evasiveness which the house owner not unnaturally shows. It is, however, realised that a full and detailed sanitary survey of every building in the city is ultimately necessary, and an attempt has recently been made to deal in a thorough and systematic manner with a small block in the heart of the town.¹ The improvement of house-drainage, the substitution of water-closets for service privies, the filling up of insanitary tanks, the improvement of private markets, cowsheds, cattle-sheds, and stables, the improvement of insanitary buildings by *e.g.* partial demolition to secure more light and air—these are some of the objects on which the efforts of the Sanitary Inspector are concentrated. In 1913-14, 7843 prosecutions were instituted, and fines amounting to Rs52,532 were imposed.

Food Inspection.—In 1864 the Justices appointed a special staff, under the control of the Health Officer, for the seizure and subsequent confiscation of articles of food and drink held to be unfit for human consumption, and the employment of some such detective agency has been continued up to the present time. The officers, however, were in no sense experts, and in 1882 the successful experiment of employing for a year a licentiate of medicine for this work, led the Commissioners in 1887-88 to sanction the appointment of four qualified Food Inspectors, who were employed in inspecting markets, dispensaries and drug-shops, the milk and fish supply, shops for the sale of meat, grain, ghee, drugs, and other food-stuffs. They were empowered to seize and destroy articles of food which they deemed unwholesome, and to purchase for analysis in the municipal laboratory samples of articles

¹ Viz. Mallanga Lane improvement scheme.

which they suspected to be adulterated. In 1901-2, on the general reorganisation of the Health Department, the Food Inspectors were abolished, as it was considered that the Sanitary Inspectors who had medical qualifications could carry out their duties. It was, however, soon found that the work was important and onerous enough to require a special staff, and five Food Inspectors—one for each district and one for Sealdah Railway Station, the principal entrepôt of the fish and milk supply of the town—were appointed.

In 1913-14 there were seven Food Inspectors ; they sent 1745 samples of food-stuffs to the laboratory for analysis, of which 33 per cent. were found to be adulterated. Nearly 600 prosecutions were instituted in the course of the year. ‘Of even greater importance from a public health point of view,’ remarks the Health Officer, ‘was the seizure ‘and destruction of unwholesome articles of food,’ of which nearly 100 tons were destroyed. There were over 500 eating-houses in Calcutta which were on an average inspected once a month. The staff was proved to be overworked, and it was decided to appoint one additional inspector.

Other Functions of the Department.—The Health Officer is also responsible for the supervision of the municipal slaughter-houses, of which an account will be found at pp. 302-11, the *dhobikhanas* (pp. 312-13), the municipal dispensaries (pp. 229-31), the burning *ghâts*, burial grounds and municipal crematorium.

Corporation Midwives.—There could be no more striking proof of the advanced and modern standpoint of the Fever Hospital Committee, which has been so frequently quoted in these pages, than its solicitude for the improvement of the conditions surrounding child-birth amongst the native population of Calcutta. The evidence which they recorded shows that even the more advanced native *kabiraj* of that time recognised the alarming infant mortality to be largely due to the primitive and unhygienic treatment, which custom of the greatest antiquity had prescribed in childbirth.

Babu Madhu Sudan Guptu in 1836 recommended the

establishment of a hospital, with a Lying-in Ward, with proper Hindu midwives 'and attendants,' instructed by a European professor of midwifery. He anticipated that a great number of married women of the inferior castes would gladly avail themselves of such an establishment, and that the trained midwives would readily find employment at a moderate charge among Hindu women of all castes and ranks. It was not, however, until 1907 that the Corporation decided to take any steps in this direction. In 1908 two qualified midwives were appointed on a pay of Rs50 per mensem, and attached to the Lady Dufferin Hospital, the medical officer of which kindly undertook to superintend their work. They were required to go round the bustees offering their services gratuitously to the poor residing in these localities. Hitherto the results of the experiment cannot be pronounced satisfactory, and in 1913-14 only 181 confinement cases were attended by the Corporation midwives.

ENGINEER'S DEPARTMENT

Appointment of Engineer.—The first Engineer to the Corporation was Mr. William Clark, appointed nominally as secretary in 1855.

In 1863 his department comprised the following branches of work :—

- (1) Roads ;
- (2) Drainage ;
- (3) Chandpal and Nimtola pumping-stations, including the old aqueduct system, by which the tanks were replenished and a supply of water distributed for the use of the townspeople and for watering the streets ;
- (4) Entally and Kotrung workshops and stores ;
- (5) The maintenance of public squares and buildings.

In 1865 the municipal railway was added to the Engineer's charge, and in 1868 the new waterworks. He was assisted by—

- (1) A Superintendent of Roads, brought from England in 1864, whose emoluments were Rs575 a month ;
- (2) An Assistant Drainage Engineer, who was also brought out from England in 1864, on a pay of Rs625 a month ; and
- (3) Two Assistant Water Engineers, appointed in 1867 on a pay of Rs475 each a month.

Changes in System, 1868-75.—In 1868 drainage, conservancy, and roads were made a separate department under an officer designated the Superintendent of Roads and Conservancy, who was under the general control of the Vice-Chairman.

A Nuisance Department, of which the principal functions were to enforce the observance of the existing sanitary regulations and to ensure the purity of articles of food and drink exposed for sale, was established in the same year under the control of the Health Officer.

It had, however, a brief existence ; it was abolished in 1869, and the Conservancy Department was then placed in charge of the Health Officer.

Arrangements in 1875.—In 1875, on the introduction of the new drainage works, the Justices effected an annual saving of Rs15,000 by restoring the conservancy to the Engineer, whose charge after the passing of Act IV. of 1876 comprised the following branches :—

- (1) Roads and Conservancy, which involved the maintenance of sewers, the cleansing of streets, drains, gully-pits, latrines and urinals, and the prevention of nuisances. A Superintendent on a salary of Rs400 a month was in immediate charge of this branch.
- (2) The new Drainage Department, the chief duty of which was the construction of the new sewers, which on completion were handed over to the Superintendent's charge.
- (3) The waterworks.

Subsequent Changes.—For administrative purposes the

town was subsequently divided into two divisions—the northern and the southern—each in charge of a Roads and Conservancy Superintendent on Rs400 a month, assisted by four overseers.

In 1878, as we have already seen, the night-soil branch was transferred from the Health Officer to the Engineer, and the supervising agency reduced. Further economies—undoubtedly at the cost of efficiency—were effected in 1882 by the abolition of a separate night-soil and nuisances superior staff, their duties being made over to the road and conservancy overseers. The change proved a mistake, and in the same year the charge of night-soil and nuisances—with a reduced staff—was again restored to the Health Department.

Engineer's Functions in 1888.—On the amalgamation of the suburbs with the town in 1888, the Engineer was left with the following departments :—

- (1) Drainage, including construction branch (town) ;
- (2) Waterworks ;
- (3) Roads and building department ;¹
- (4) Suburban drainage (construction branch).

The constant changes of the last quarter of the nineteenth century had naturally been very detrimental to the efficiency of the municipal staff, particularly in the matter of conservancy ; responsibility was either divided by the dual control of the Health Officer and the Engineer, or repudiated by that Department which had last inherited the mistakes of the other.

Reorganisation of 1901.—In 1901 the problem was firmly attacked. The concentration of power in the hands of a few executive officers at headquarters gave way to a decentralised system, already referred to, by which Calcutta was divided into four districts, each equipped with a large and responsible staff, capable of handling with some initiative and independence all matters relating to the conservancy, drainage, water supply, roads, and public health of such district.

¹ Act II. of 1888 contained some provisions regulating the construction of buildings.

The conservancy of the city was finally made over to the Engineer, and no one can doubt that the administration of this important branch has gained in efficiency by its transfer to a department which controls the drainage, roads, and unfiltered water supply of the city.¹

Each district engineer was given a gowkhana with a sufficient number of coolies, carters, animals, and carts, managed by a capable and well-paid superintendent. He is assisted also by two supervisors,² one in charge of engineering and the other in charge of conservancy works, who in their turn control the overseers and sub-overseers of their districts. The whole staff, including the district engineers, are under the control and direction of the Chief Engineer.

The labour establishment is divided roughly into four classes, engaged in the following work :—

- (1) Cleansing of service privies ;
- (2) Bustee conservancy ;
- (3) Cleansing of sewers, gully-pits, and drains ;
- (4) Repairing, cleansing, and watering roads.

The labour gangs of each class have defined areas, called 'Blocks,' allotted to them, each in charge of a sirkar or ganger, who is responsible for the work of his gang.

To each district is attached a small stores depot.

The Engineer of District III., in addition to his ordinary duties, is in charge of the municipal railway, the drainage outfall works, the pipe depot, and the condemned stores depot.

STORES DEPARTMENT

Arrangements for Stores, 1840-63.—Prior to 1840 the only important item of stores required for municipal purposes was road materials ; these were supplied by con-

¹ No opinion is here pronounced upon the alternative of an independent, efficient conservancy establishment, but taking the Calcutta municipal system as it stands, no observer will probably contend that conservancy pertains more closely to the Health than to the Engineering Department.

² District I. has three supervisors.

tractors, who delivered them to the overseer known as the Executive Officer and responsible to the Superintendent of Roads. Later on the lighting of the town was taken in hand and the drainage works commenced, and the supply of stores became a matter of the first importance. The gowkhanas were used for the storage of small articles such as lamps, lamp-posts, brackets, and street name-plates; bricks and *surkhi* were obtained from Kotrung; while steam engines, pumps, etc., were stored at Chandpal Ghât or the bonded warehouse. Road metal was collected at various depots, of which the most important were those at Baghbazaar, Nimtola Ghât,¹ and Hastings.

New Depots established.—In 1864 a stores depot was established at Entally, and another in 1867 at Jaunbazaar, and before long we find the municipality using depots for various stores at the following places :—

- (1) Entally : iron, oil, and miscellaneous stores.
- (2) Newmarket : drainage pipes.
- (3) Jaunbazaar : drainage pipes.
- (4) Nimtola pumping-station : drainage pipes.
- (5) Sibtola : road metal.
- (6) Strand Road : road metal.
- (7) Hastings : ² road metal.
- (8) Baghbazaar : road metal.
- (9) Kotrung : bricks, *surkhi*, etc.

After the opening of the waterworks, pipes were kept on a site in Circular Road, near Entally, which was subsequently converted into a permanent depot for waterworks stores.

Stores Superintendent appointed and subsequently abolished.—With the growth of municipal enterprise the charge of stores became an onerous task, and in 1880 the Chairman appointed a Superintendent of Stores, who was

¹ Abolished in 1893-94.

² The Hastings depot was taken back by Government in 1880, and the Baghbazaar Depot subsequently became the chief Corporation depot. It now measures about twelve bighas, extensions having been made in 1882-83, 1901-2, 1910-11, and 1911-12, at considerable cost. The Justices originally paid an annual rent of Rs11,500 to Government for the depots at Hastings, Baghbazaar, and Nimtola. In 1863 the rent was remitted, and three additional sites were also made over to the town by Government.

responsible for the purchase, receipt, and issue of articles required for the different departments, as well as for their quality, quantity, and price. The new department, however, which cost about Rs10,000 a year, did not justify itself, and it was abolished at the reorganisation of 1901; the district engineers and other officers, such as the superintendents of gowkhanas and pumping-stations and the pipe depot overseer, were given reserve stocks of the stores they required, to be replenished from time to time. These officers submitted annual indents each year, which, after being checked by the Chief Engineer and sanctioned by the proper authority, were ordinarily purchased from contractors at authorised rates.

Reorganisation of 1913.—In 1909 the Chief Engineer submitted a note commenting on the inadequate supervision of petty works, and amongst other remedies advocated the creation of a Stores Department, to ensure the supply and use of good materials. A sub-committee was appointed to consider this proposal, and strongly recommended the establishment of such a department under an efficient and above all a trustworthy Superintendent. They urged that three important objects might be thereby attained, viz.:—

- (1) The use of materials of good quality;
- (2) The purchase of materials in large quantities, and therefore at the lowest rates;
- (3) The prevention of delay in municipal works by the maintenance of adequate stocks of all materials ordinarily required.

They proposed that the Superintendent should receive a salary of Rs500-600 a month. Their report was adopted as it stood by the General Committee in January 1910, but in the meantime it was decided that a strong committee should consider the question of entirely reorganising the municipal machinery, with special reference to the expediency of replacing the 'district system' by a highly centralised form of administration.

The proposal to revive the post of Stores Superintendent was laid before this committee for examination.

In their report of the 26th June 1912, the committee, while recommending the retention of the district system, advocated the formation of a new Stores Department directly under the Chairman and independent of the 'spending' departments.

The annual value of stores purchased by the Corporation amounted roughly at that time to 12 lakhs of rupees ; it was decided to appoint a Superintendent on a pay of Rs500-600 per mensem, and that he should be required to furnish security of Rs50,000. The appointment was made in 1913, and the following duties were attached to the office :—

- (1) To maintain an adequate stock of all stores required by the Corporation ;
- (2) To examine and pass all such stores, when delivered ;
- (3) To inspect works in progress, and to see that there was no waste and no substitution of inferior stores ;
- (4) To inspect and to supervise the management of every depot and sub-depot ;
- (5) To prevent the accumulation of unserviceable stores.

The cost of the new department amounts to over Rs25,000 per annum—by no means an excessive sum if it secures economy and efficiency in the purchase of stores costing about 12 lakhs. At the time of writing much has been done to set the new department on a solid footing, but some time must elapse before the organisation is complete. An adequate central stores godown, with subsidiary district stores, is the first requisite for efficient working. The central godown is estimated to cost Rs2,71,000, and steps have been taken to acquire a site in Entally.

Yard for Condemned Stores.—Unserviceable stores are dispatched to a separate depot near the Entally workshops, and the elimination and disposal of such stores is one of the duties of the Superintendent.

The proceeds of the auction sales held by him in 1913-14 amounted to Rs18,100, as against Rs11,400 and Rs9200 in the two preceding years.

Stocktaking.—Until 1906-7 there was no regular stock-taking of municipal stores. In 1905-6 a Travelling Auditor was appointed, with the special purpose of taking stock annually of all stores, and the first general stock-taking was commenced in 1907-8. Detailed instructions to the storekeepers and the auditor were framed in 1910-11, and this section may now claim to be on a satisfactory footing.

LIGHTING DEPARTMENT

This department is of very recent growth. From the earliest times down to 1910 the street lighting was in the hands of private contractors. In 1836 the lamps and lamp-posts were supplied at fixed rates by a municipal employee, known as the Executive Officer, while a contractor furnished the oil and wicks and kept the lamps¹ in order at the rate of Rs1.2.6 per lamp per mensem. An overseer on a pay of sicca rupees 60 per mensem was responsible—in addition to superintending the watering of a portion of the town—for seeing that the contractor performed his duties efficiently.

In 1858-59 the first contract with the Oriental Gas Company came into operation; the introduction of gas lighting was at first only partial, but the system was extended as rapidly as possible. In 1869 an Inspector of Lighting was appointed on a salary of Rs200 per mensem; his chief duties were the inspection of street lamps and the reporting of defects in the lighting. At the reorganisation of 1901 this post was abolished, and its duties were transferred to the District Engineers. In November 1902, however, it was decided to improve the supervision by appointing four lighting sub-overseers.

Lighting Department created 1910.—In 1910 the Corporation took the very important step of creating its own Lighting Department, which assumed the entire management of the city lighting, the illuminant only being supplied by the contractors, the Oriental Gas Company. It is the duty of the department to ascertain

¹ There were 313.

by photometric tests that the illuminant is supplied at the requisite purity and pressure, to arrange for the lighting and extinguishing of the lamps at the proper hours, and to keep in working order, with the necessary replacements, all lanterns, lamps, posts, and other accessories. It is impossible to convey in this sketch an adequate idea of the difficult and complex problems involved in such a change of administration—a change, moreover, which the contractors could not be expected to greet with enthusiasm. The Corporation was, however, fortunate in the selection of its first Lighting Superintendent, Mr. H. V. Eastwell, of whom the Chairman wrote in 1913-14 as follows : ‘ He has brought the lighting of the city to a state of efficiency which it never attained before, and is deserving of the highest credit.’

While the new department was still being organised, the Oriental Gas Company presented a claim for a sum of Rs2,29,000, of which Rs1,36,000 was for an alleged leakage of gas in Corporation fittings. The dispute was referred to arbitration, and after a protracted hearing the arbitrators awarded the Company a sum of Rs55,000 in full settlement of their claims. They also prescribed the maximum average monthly pressure at each of the pressure-boxes, and it was decided that for gas supplied in excess of this maximum no payment should be due.

When the account of the Gas Company had been finally settled, it was found that the total expenditure during the first year’s working of the new gas contract showed a saving of nearly a lakh of rupees as compared with the old arrangement, while for 1913-14 the saving amounted to Rs1,01,745, although the new establishment charges alone were one lakh.

Present Position of the City Lighting.—At the end of 1914 there were 11,139 lamps in use, many of a new and superior pattern.

A commencement was made of the erection of two-light lanterns at street corners, with glass slips indicating the street names, and the number of oil-lamps still in use was reduced to 1799. In undeveloped areas it is obviously uneconomical to lay gas mains, and there

must for many years be a residuum of oil-lamps ; the number, however, is still in process of reduction, and where such must remain, lamps of an improved lighting pattern are being set up. Proposals to install electric lighting in certain streets are under consideration. The Lighting Department has given much attention to the improvement of the lighting in municipal buildings, and a considerable saving in gas consumption has been effected in this direction.

BUILDING DEPARTMENT

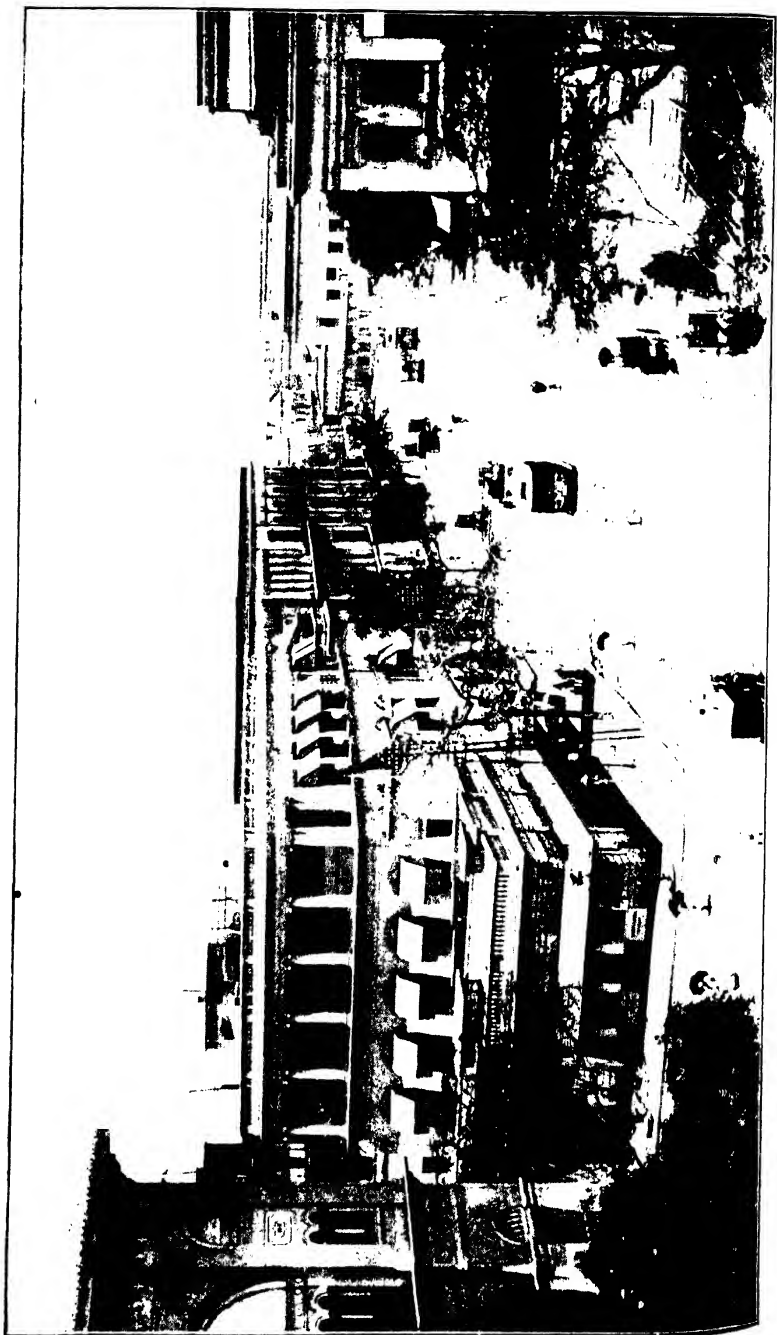
Slow Development of Municipal Control over Building Operations.—In 1690 Job Charnock issued a proclamation permitting settlers in Chuttanutte to erect houses at their pleasure on any of the waste lands belonging to the Company. In March 1707 the Council forbade the erection of irregular buildings, but their order appears to have remained a dead letter.

In 1803 Lord Wellesley in his famous Minute pointed out that an end should be put to irregularity in building, which rendered order and system impossible in the growth of streets and lanes.

In 1836 the Fever Hospital Committee made proposals for restricting the building in Calcutta of straw huts, which for many years had been responsible for the disastrous fires that constantly swept across the town. Act XII. of 1837 was the first enactment¹ in which the authorities assumed control over private building operations ; it was, however, merely a prohibition against the erection of straw-roofed or matted huts.

Act XIV. of 1856, Act VI. of 1863, Act IV. of 1876, Act II. of 1888, and Act III. of 1899, all contained provisions similar to those of Act XII. of 1837.

¹ Lieutenant Abercrombie, writing early in 1837, says : ' Connected with the consideration of the prevention of accidents by fire, is that of the entire manner of building throughout the town ; for the control of which there is not, to my knowledge, a single enactment in existence.' A bye-law forbidding the erection of straw huts had, however, previously existed, but was repealed in 1781.



Act II. of 1848, Act XII. of 1852, Act XIV. of 1856, Act VI. of 1863, and Act IV. of 1876 provided also for notice being given to the Commissioners before the building or rebuilding of a house, while the latter three Acts made the submission of plans compulsory, and vested the Commissioners with certain powers of demolition.

Need of Building Regulations.—Act II. of 1888 provided more elaborately for the control of private building, and gave specific power to frame bye-laws for this purpose. Yet even this Act and the bye-laws framed thereunder proved, as the Health Officer, Dr. Simpson, showed in successive annual reports, a very inadequate instrument for achieving the desired end. In 1887 Dr. Simpson wrote the following criticism of the new Act, which was then on the stocks :—

‘There are certain regulating powers in the Municipal Bill, but of such a general character that they admit of nothing practical. They would never prevent a proprietor, if it suited him to do so, from filling up the compounds of the European quarter with other houses, however detrimental to health the want of space and the deprivation of free circulation of air round the building would be to the occupants of this and neighbouring houses. . . . Nor will the regulations prevent the owner of a bustee which is covered with one-storied huts pulling down the huts and covering every portion of the land with brick-built houses which may be of two or more storeys, and the only access to which would be by narrow and winding dark passages obstructive of air and light and fatal to efficient drainage. Such extreme examples are now to be found in different portions of the native town. The land so over-crowded with houses becomes an unhealthy area. Where there is space for five houses, double that number are erected. Daily we see houses being built in this fashion with little regard to access, aspect, ventilation, or drainage, and zig-zag passages are gradually formed which take the place of streets.’

The provisions of the Act were defective in not limiting the height of houses, in not defining the width of new streets, or prescribing minimum spaces for separating

one house from another. It was, moreover, impracticable for the Engineer to enforce the law without a special staff.

Between 1889 and 1897 Dr. Simpson pressed incessantly for a new Building Act, but he was a voice crying in the wilderness ; and by 1897, when the Building Commission was appointed, the evils which he had so plainly foreseen had come to pass, and, in respect of its buildings, the last state of Calcutta was in a fair way to become more deplorable than its first. The huts in bustees were beginning to give place to masonry buildings, which did not abut on streets or share in the advantages offered by the drainage system ; set down, moreover, without a plan, they were bound, as the Health Officer foresaw, to block or at least enhance the cost of the road system which would inevitably at some date be needed to open up such areas. In 1896 the Chairman (Mr. Ritchie) proposed the creation of a separate Building Department under a City Architect, and the expediency of having on the municipal staff an officer with architectural qualifications was raised by the Building Commission.

Legislation of 1899.—This body was constituted by the Government of Bengal on the 6th April 1897, and its weighty and valuable report was submitted on the 23rd December of the same year. Its recommendations formed the basis of the new building regulations, contained in Schedules XVI. and XVII. of Act III. of 1899. In 1905 a special committee was appointed to revise these regulations, which were considered to be unnecessarily rigid and harsh in their operation. The amendments suggested by the committee were submitted to Government, who in April 1908 appointed a new committee, on which the Corporation was strongly represented, to re-examine the whole subject.

The proposals of this committee were published, and the objections received from the public were examined by another special municipal committee. The regulations now in force embody the suggestions which survived this prolonged inquiry. They did not, however, cover 'public buildings,' which as defined in the Act include

schools, hospitals, large hotels, etc., and in 1910-11 rules were added to Schedule XVII. so as to secure for such buildings sufficient light and air, proper means of exit, and an adequate use of fire-resisting materials in the construction of staircases and corridors. The rules governing the erection of 'supported' or 'projecting' verandahs over streets (*vide* section 340 of the present Act), and the special restrictions prescribed under section 367 in respect of shops and buildings of the warehouse class, the regulation of the architectural features of building in certain areas and other matters of detail are fully dealt with in the useful Building Manual, which prescribes the procedure of the Department.

Legal Rulings.—The administration of the Department has been hampered in no small degree by difficulties in the interpretation of the law. We do not exaggerate in stating that its success in preventing the rebuilding of Calcutta on the old insanitary lines has in recent years hung chiefly on the issue of the struggle which, between 1902 and 1911, centred round the word 're-erect' and the interpretation of section 391 of the Act. It was held by many Commissioners that if less than half the 'cubical extent' of an existing building were demolished, it might be reconstructed *without complying* with the rules, provided that the former external dimensions were retained. This view, which was calculated to perpetuate insanitary buildings on valuable and therefore overcrowded sites, was challenged by the Executive, who were supported by the opinions of the Solicitor to the Corporation and of the Advocate-General. The opinions of four eminent counsel were from time to time taken, and it must be admitted that their views were somewhat divergent. The General Committee decided to adhere to its own interpretation of the law, and framed a fresh reference for counsel.

A very clear and concise opinion was obtained in 1911 from Messrs. C. P. Hill and B. Chakravarti, counsel; it was accepted by the General Committee, and governs the present practice of the Department. While holding that section 391 'confers upon the General Committee

full and unrestricted discretion to consent to any alteration of, or addition to any building in violation of 'the statutory provisions relating to buildings and of the building regulations framed under the Act, the opinion upheld the vitally important principle that *all* additions and alterations to existing buildings, *irrespective of the cubical extent of the reconstruction made*, are subject to the provisions of the law and Schedule XVII.¹ It is the present practice in all cases of 'reconstruction'—to use a term which has been discredited by the laxities of controversy—for the head of the Department to inspect personally the building in question ; if he considers that the exigencies of the site, or the expediency of encouraging an owner to rebuild instead of coming into conflict with the law by clandestine 'repairs,' justifies some relaxation of the rigour of the rules, he may make recommendations to this effect for the consideration of the committee.

After examining the plan, the committee may accept, modify, or reject his proposals in the exercise of their discretionary powers under section 391.

The owner of the building may in the alternative prefer an appeal, under section 383 or 387, against the ruling of the Department to the Appeals Sub-Committee, whose proceedings are subject to confirmation by the General Committee. Important opinions of counsel and rulings of the courts, relating to *all* matters of difficulty arising out of the administration of the Act, and covering the period from 1900 to 1911, have been collected and reprinted in two useful volumes entitled *Legal Opinions and Rulings*.

Regulation of Theatres.—The regulation of theatres first came under the consideration of the Commissioners in 1903 ; draft bye-laws were framed by the Corporation in 1906, and sanctioned by Government in its Notification No. 1054, dated 16th July 1908. The bye-laws were long overdue, for the Calcutta theatres, with one or two exceptions, were constructed and conducted with an absolute neglect of the most elementary precautions for

¹ Which, however, may be relaxed by the General Committee acting under section 391.

the public safety. Such matters as fire prevention or control, adequate exits, proper seating arrangements, stability of construction—in short, every condition regarded as essential in the building or management of a Western theatre—had been left entirely to the discretion of the proprietor, and the fact that the annals of the Calcutta theatres had been marked by no appalling catastrophe must seem to any one who has inspected them, nothing short of a miracle. During the last four or five years considerable progress has been made in bringing the theatres into conformity with the bye-laws. The Act does not enable the Corporation to use the most effective means of control, viz., the power of licensing theatres, and the very substantial progress already made has been obtained by constant and wearisome prosecutions under the bye-laws. In 1913-14 four theatres closed, as their owners were apparently unable either to pay repeated fines or to bring their buildings into conformity with the bye-laws; in the case of two theatres, extensive alterations were made in the same year, in accordance with the requisitions of the Department.

A special theatre inspector was employed throughout the year; the fines (including those imposed for late performances) amounted to Rs9603.

Building Department created.—At the general reorganisation in 1901 it was decided to form a Building Department with a City Architect at its head. The Deputy Chairman administered the new department until January 1903, when Mr. H. T. Bromley, A.R.I.B.A., assumed charge. In 1905 the staff was improved by the substitution of Building Overseers with technical qualifications on salaries of Rs30-50 per mensem for the old building sirkars, who were little better than peons, on salaries of Rs10 a month.

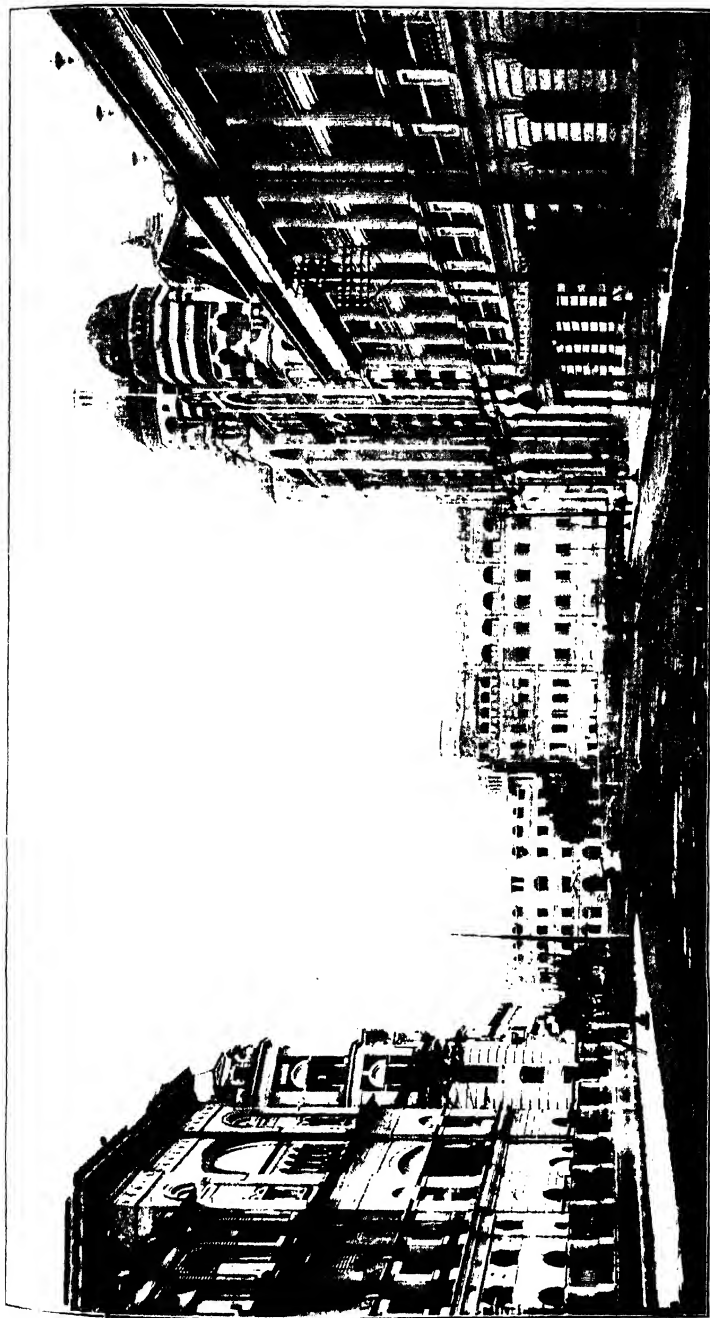
In August 1907, on the ground that the District Building Surveyors had now been sufficiently trained, that difficult points of the law had been cleared up and the work of the Department well organised, it was decided by a small majority, on the proposal of the Chairman, to abolish the post of City Architect, and in November

1907 the work of the Building Department in each district was placed in charge of the District Engineer, under the supervision of the Deputy Chairman.

Deputy Chairman in Charge of Department 1908-12 (September).—The check which the District Engineers had been expected to exercise proved to be very nominal. The statutory provisions of Act III. of 1899 in relation to buildings were both comprehensive and important ; the bye-laws framed under the Act were elaborate and difficult of interpretation. The District Engineer, already overburdened with his varied duties, did not obtain the grasp and intimate knowledge of the building law which the Building Surveyors possessed, and in course of time the direct control of the Department passed into the hands of the Deputy Chairman. It was agreed that the successive Deputy Chairmen administered the regulations with judgment and impartiality, but apart from the fact that their more proper duties were already sufficiently heavy, there was a general consensus of opinion that the services of an experienced architect were necessary to guide and harmonise the many building schemes which the operations of the City Improvement Trust were expected to initiate, to prepare designs for important municipal buildings, to advise what street improvements might be effected at comparatively small cost on the demolition of old buildings, and finally to check the jerry-building which goes on in Calcutta to a regrettable extent.

Revival of Post of City Architect 1912.—The question was considered in all its bearings by the Reorganisation Committee of 1910,¹ and a City Architect on a pay of Rs1250 a month, with a motor car allowance of Rs100 a month, was appointed in September 1912. At the same time the offices of Assessor and Surveyor were separated, the duties of the latter being assigned to the new City Architect, who is assisted by a Deputy Surveyor. The subordinate building staff has also been strengthened, and there are now eight Building Surveyors on pay varying from Rs150-300 a month, and ten Building Inspectors

¹ Their report was submitted on the 29th June 1912.



CLIVE STREET OF TO-DAY

Photo by Bourne & Shepherd, Calcutta

on a pay of Rs100-150 a month, with qualifications which render them eligible for promotion to the posts of District Building Surveyors. The additional expenditure involved by the changes amounted to about Rs19,000 a year. The Chairman in his report for 1913-14 states that the results have 'amply justified the Corporation in reviving the appointment of City Architect.'

PRINTING DEPARTMENT

Establishment of a Municipal Press 1866.—Until 1866 the proceedings of the Justices were recorded in manuscript and their printing work executed by private agencies.

In that year it was decided to print the list of business to be transacted at the ordinary and quarterly meetings, and to circulate copies to the Justices. The increase in printing charges led the Justices in the same year to set up a printing press of their own, at a capital cost of Rs6000. Neither the volume nor quality of the work turned out by this Press was satisfactory, and in 1872 Mr. Thomas Jones, who had a practical knowledge of printing, was invited to reorganise the Department.

He succeeded in reducing establishment charges, but, the Department was still far from efficient.

Reorganisation of Press taken in Hand 1889-1904.—In July 1889 a committee was appointed to examine and report on the question of accommodation, establishment, and plant. Some members of the committee were of opinion that the printing work would be done more economically by contract, and their view so far prevailed that the committee recommended that the work of the Department should be confined to matters of ordinary routine, or of an urgent or confidential character.

The Commissioners, however, did not adopt the report, and in 1890 appointed a second committee to examine the subject in more detail. This committee, which discovered some irregularities in the Department, drafted some rules to regulate its procedure, and made recom-

mendations (1) for the purchase of additional plant and material, (2) for increased accommodation, (3) for strengthening the staff, and (4) for the grant of overtime allowance and the adoption of a system of piece work.

These recommendations, with the exception of (4), were adopted, and the Department was reorganised on these lines.

Reforms of 1905 and 1907-8.—In 1905 the somewhat obvious reform of standardising all forms in use in the Corporation was introduced, the system of work and the equipment improved, and the staff further strengthened.

It was not until 1907-8 that the old haphazard practice of having forms printed as required was replaced by an annual indent system.

Reorganisation of 1909-10.—For many years the Department had been subjected to an ever-increasing strain, and in 1909-10 Mr. Monro, a practical printer, was consulted by the Corporation. On his advice large structural alterations were made to improve the accommodation and lighting of the Press; two linotype and three other modern machines were purchased, along with other necessary plant, at a capital cost of Rs34,000.

In 1910-11 the total output of the Press was estimated at Rs78,830, while the expenditure on establishment, stationery, and all other charges, excluding interest and depreciation charges, did not exceed Rs44,380. It is worth mentioning that just before the introduction of Mr. Monro's scheme, Messrs. Gulab Singh and Co., the Government contractors, offered to do the whole printing work of the Corporation for an annual payment of Rs50,000 with an annual increment for ten years of Rs3000, the Corporation plant to be taken over by that firm at a valuation.

Even if such an arrangement commended itself on grounds of economy, it can hardly be doubted that the saving would have been effected at the expense of convenience, while the value of a direct control over the establishment is no small asset.

Subsequent Reforms.—In 1912-13 the general reorganisation of the staff and its methods of work were taken in

hand, and some valuable reforms were introduced. In 1913 the post of Printer was abolished, and a Press Superintendent on an increased pay (Rs252 a month) was appointed. Two additional linotype machines have been installed, and the number of hand compositors reduced. The total output of the Press in 1913-14 was valued at Rs80,146, and included 16,412 pages of solid matter and 6224 pages of tabular matter ; 39,41,924 job forms were also printed.

The employment of outside presses was reduced to the minimum limit, only vernacular notices costing a trifling amount being so printed. The expenditure for overtime work, which had been an extravagant item in the Corporation press charges, amounted to only Rs4385.

The total expenditure for the work of 1913-14 was Rs42,895, of which establishment charges accounted for Rs15,588.

LICENSE DEPARTMENT

As already stated, the post of License Officer was created in 1866 ; he was paid Rs250 a month, and assisted by a Sub-License Officer (Rs50 per mensem), 4 clerks (Rs25 per mensem each), 3 sirkars (Rs10 per mensem each), and 5 peons.

In 1867 he was relieved of the registration of carts and hackeries, this work being transferred to the Police, who already had an organisation for registering hackney carriages. The efficiency of the License Department was also increased at a cost of Rs250 a month. In 1868 the combined registration branch was retransferred from the Police to the License Officer, under the direct supervision of the Chairman, but the duties were heavy, and the registration of hackney carriages was speedily made over again to the Police. Under Act IV. of 1878, however, the Justices again became the registering authorities for hackney carriages, and the License Officer in 1880 was appointed registering officer under the Act. He discharged this duty until 1891, when a separate officer was appointed for this work.

Organisation of Department.—The work of the License Department was for long unsatisfactory, and it is only in recent years that it has attained its present efficiency.

It was not until 1874 that the unsound system of awarding to the Inspectors a proportion of the fines levied on defaulters was abolished; an increase of revenue and a decrease in the number of prosecutions was the result. In 1880-81 it was noticed that the revenue of the Department had not kept pace with the great expansion of trade in Calcutta, and a committee was appointed to examine into the working of the Department. Amongst its important recommendations, the following may be mentioned, viz., that the Department should be placed under the direct control of the Chairman (the system of accounts still remaining subject to the Vice-Chairman's supervision); that more importance should be attached to outdoor inspection work on the part of the License Officer; that the provisions of the Act which required assessors to pay taxes into the office should be enforced, and the Inspectors relieved from the work of outdoor collection; that a special establishment should be entertained for the registration of hackney carriages, palanquins, and carts; and lastly, that the Inspectors should, as far as possible, be relieved of all clerical work. These proposals were adopted at an additional cost of Rs475 a month, but the collections showed little improvement, and in 1881 it was found advisable not to insist on the payment of small assessments at the Municipal Office, and to give the Inspectors additional sirkars to assist them in collections. In 1886-87 serious irregularities in the administration of the Department were investigated by a special sub-committee; the License Officer subsequently resigned, and considerable changes were made in the personnel of the subordinate staff.

In 1903-4 the Department was for the third time reorganised and important changes were introduced. The essential features of the scheme were the separation of the assessing and collecting branches, each under a Deputy License Officer on a salary of Rs300-400 a month, and the strengthening of the staff.

The collection of the tax levied on street hawkers and itinerant vendors, which had been abandoned in 1888, was revived, two sub-inspectors being appointed in 1904 for this special work. The register forms were revised to render the daily audit of collections more easy and thorough. Nevertheless, in 1905-6 irregularities crept into the collecting branch, which resulted in the dismissal of the Deputy License Officer in charge and the abolition of his post. The audit system was again modified and made more effective, while the assessing inspectors were authorised to collect taxes from the licensees at the time of assessment. The latter change was important, in that it led to prompter payments and less frequent resort to coercive measures or to cancellation. In 1909-10 the bonus system, to which reference has already been made in the account of the Collection Department, was introduced in the License Department, an annual bonus of Rs35, Rs30, and Rs25 being offered to the senior, junior, and sub-inspectors respectively, provided that the collections exceeded 98 per cent. of the net demand, exclusive of cart registration fees and hawkers' taxes.

A bonus of Rs100 per annum was promised to each bailiff on the same condition. The details of the scheme were to some extent modified in 1913,¹ but the underlying principle—the recognition of the value of a personal incentive for spurring on a staff, whose success must largely depend on individual and voluntary zeal—has justified itself and remains unchanged.

Sources of Revenue.—The revenue of the Department was formerly derived from fees levied on the issue of licenses for scaffolding or other projections over the road, fishing and cutting grass in public tanks and squares, slaughter-houses, privately owned latrines, etc. The Department is now responsible for the assessment and

¹ Ninety-eight per cent. of the net demand is assumed to be a fair average collection, and until this limit is reached the Department does not qualify for bonus. Assuming this minimum to be attained, it has now been arranged that 20 per cent. of the *annual increase* in collection in any year, *over the previous year's collection*, shall be distributed as bonus amongst inspectors, sub-inspectors, and bailiffs, in the proportion of 4½, 3½, and 1 respectively. The hawker's tax and hackney carriage fees are excluded from the calculations.

realisation of taxes and fees falling under the following heads :—

- (1) Tax on trades and professions ;
- (2) Tax on carriages and horses ;
- (3) Scavenging tax ;
- (4) Tax on offensive trades and meatshops ;
- (5) Tax on private markets and slaughter-houses ;
- (6) Cart registration fees ;
- (7) Fire Brigade tax.

• (1) *Tax on Trades and Professions* (Sec. 198, Act III. of 1899).—In considering the practicability of increasing the revenue of the town in 1837, the levy of an ‘ impost on shops ’ was not overlooked by the Fever Hospital Committee. Such a tax already existed in Bombay, but the labour of equitably adjusting a tax of this kind was exaggerated by the Calcutta executive, and the proposal was not pressed.

Act VI. of 1863 first authorised the levy of the tax in accordance with a tariff annexed to the Act, which fixed the maximum at Rs100 and the minimum at Rs1. Act II. of 1888 raised the maximum to Rs200, but the tariff in its main outlines has remained practically unchanged. The systematic and carefully regulated annual revision which is now made by the Inspectors contrasts strikingly with the cursory street-to-street inspection, which formed the basis of all earlier revision, and the gain in revenue has been great ; between 1863 and 1876 • the annual receipts were 2 to 2½ lakhs of rupees, in 1901-2 the tax realised Rs4,20,000, while in 1913-14 the collections amounted to Rs7,52,000.

(2) *Carriage and Horse Tax* (Sec. 188).—In a memorandum submitted by Mr. M'Farlan to the Fever Hospital Committee in 1837, he writes : ‘ As the least objectionable mode of raising an additional fund, I would propose a tax upon carriages, and perhaps horses, the proceeds • of which should be applied to the maintenance and repair of existing roads and the construction of new ones. . . . A toll to make persons residing out of the limits of the town pay for a benefit enjoyed would be necessary.’

He estimated that this tax could be made to produce Rs1,20,000. His proposal was approved by the committee, and a quarterly tax on carriages, carts, and horses was authorised by Act XVI. of 1847, abolished by Act X. of 1852, and reimposed by Act XXVIII. of 1856. Act VI. of 1863, under which the levy of the tax was fixed each half-year instead of each quarter, provided for a system of 'self-assessment,' by requiring the owner of a carriage or horse to ascertain his liabilities and to remit his dues to the Municipal Office; it also gave the Department powers to inspect stables in order to verify the returns.

In practice, however, the obligation imposed on the assessee was lightly borne, and the inspection of stables became a half-yearly departmental assessment, street by street and house to house, printed returns, though not legally required, being left for each licensee to fill in and forward with the fees to the head office. The introduction of the tramway system, the increasing use of bicycles, and more recently of motor cars, and the coercive action of the Health Department, which has forced many hackney carriage stables beyond the town limits, have prevented any great expansion in revenue under this head. During the early years of the tax it realised about Rs30,000; in 1857 the collections were Rs77,756; by 1876 the receipts had amounted to over a lakh of rupees; in 1913-14 they were well under 2 lakhs.

(3) *Scavenging Tax* (Sec. 203).—There was, strictly speaking, no scavenging tax prior to Act III. of 1899, though the levy of trade refuse fees, under Act VI. of 1863, covered some part of the same ground. The tax is levied on hackney-carriage owners, carters, milkmen, etc., exercising their callings in Calcutta, where the refuse accumulating on the premises is removed by the conservancy staff. In 1913-14 the receipts amounted to Rs58,688.

(4) *Tax on Meatshops* (Sec. 494) and *Offensive Trades* (Sec. 466).—The regulation of shops for the sale of meat was first provided by section 356 of Act II. of 1888, with the view of, firstly, concentrating such shops in one place

for the better exercise of sanitary control; and secondly, to prevent outside butchers from underselling those who were more strictly controlled inside markets. A scale of fees, with a minimum of Rs12, was prescribed under the law; the fee, however, at present in force is uniform and fixed at Rs12 per annum. The annual collections amount to about Rs2000. The premises licensed under section 466 of the present Act may be roughly divided into two classes :—

- (1) Those in which horses or other cattle are kept for sale or hire, or for the sale of their produce; and
- (2) Premises used for storing (for trade purposes) or selling combustible goods, such as timber, hay, coal, etc., or for any of the numerous trades specified in Schedule XVIII. of the present Act, and generally classed as 'offensive' trades.

No charge was originally made for the registration of premises of the former class, but in 1856-57 a scale of fees for the grant of annual licenses was sanctioned by Government.

Under Act IV. of 1876 the licenses were issued every half-year, and the maximum fee was Rs5; the provision was aimed rather at regulating trades which are liable to become a nuisance to the public than at tapping a new source of revenue. While the fees therefore were collected by the License Department, the premises were required first to be certified by the Conservancy Department, which has in recent years been relieved of this duty by the Health Department. Fees in respect of premises falling under class (2) were first levied in 1890-91.¹ Fees were, however, only levied where no trade license was otherwise required to be taken out, in accordance with a view expressed by the magistrates.

In 1901-2 the opinion of the Advocate-General was obtained; he advised that the fact that a person had taken out a trade license did not exempt him from the liability to take out another license under the offensive

¹ In the suburbs such fees were realised before the amalgamation; there were no trades license fees.

trades section, and this opinion has since been followed, a revision of the scale of offensive trade fees having been made in 1902.¹ The fees in 1913-14 amounted to Rs24,160.

(5) *Market and Slaughter-house Fees* (Sec. 481).—These fees were first levied under the present Act, the minimum fee in the case of a slaughter-house being Rs100 a year, and in the case of private markets Rs50 a year. The owners of markets are also liable to pay a scavenging tax under section 203 and Schedule IX. of Act III. of 1899, but on the advice of the Advocate-General it is levied only on those markets where live-stock is sold. The revenue under head (5) is naturally small, amounting in 1913-14 to Rs2455.

(6) *Cart Registration Fees*.—Act XVI. of 1847 first authorised the levy of a tax on carts, and the annual fee was fixed at Rs5. By Act X. of 1852 the tax was repealed, but it was again authorised by Act XXVIII. of 1856, which provided for the seizure and sale of all unregistered carts, but did not make prepayment of the fee compulsory. Act VI. of 1863, section 45, which is re-enacted in section 208 of the present Act, imposed a half-yearly registration fee of Rs4, payable in advance. The receipts in 1913-14 amounted to Rs1,13,907, of which as its share of the surplus (after deducting working expenses) the Corporation received Rs81,766.

(7) *Fire Brigade Tax*.—The measures taken to carry out the provisions of the Licensed Warehouse and Fire Brigade Act are more fully dealt with elsewhere (pp. 280 *et seq.*). The fees are collected by the License Department, which receives a yearly commission of Rs3000 on the receipts; these amounted in 1913-14 to Rs76,720. Applications for licenses by the occupiers of warehouses, which come within the provisions of the Act, are submitted to the Chairman along with plans of the building, and licenses are finally issued by the License Officer on the recommendation of the Commissioner of Police, whose officers conduct all prosecutions against defaulters.

¹ This scale, as revised in 1906, still holds good.

Bengal License Tax.—Under Act I. of 1878, a tax, known as the Imperial License Tax, was imposed on certain trades and professions carried on in Bengal, including Calcutta. It is to be distinguished from the somewhat similar local tax levied under the Calcutta Municipal Act. At the suggestion of Government, the Commissioners agreed that the Act (I. of 1878) should be administered by the Chairman, through the agency of the License Department, the Municipality receiving a commission of 8 per cent. on collections for its services. The new tax, however, proved extremely unpopular, and its assessment and collection imposed a severe strain on the time and energies of the executive, while the Commissioners, who were formed into Benches for the hearing of appeals, devoted 102 sittings to the disposal of 2374 objections during the first year of working the new Act. * It was clear that the Corporation had accepted this fresh responsibility to the detriment of its proper duties, and Government was asked to make other arrangements for administering the Act ; it was repealed in 1880 by Act II. of that year.

Liability of Joint-Stock Companies to Taxation.—As early as 1863 certain Joint-Stock Companies established abroad, but carrying on business in Calcutta through local agents, disputed their liability to pay any trade license tax. A friendly suit was instituted to test the point, and the contention of the Justices was upheld by the Court. There was however no decision as to whether* the goods of the agents could be distrained for the realisation of the tax, and in the end it was considered more prudent to leave such companies unassessed. A similar difficulty arose in 1893-94, the obscurity of Act IV. of 1876 having unfortunately been repeated in the Act of 1888, and a test case instituted against an Insurance Company, which had its head office in Liverpool, was decided against the Corporation in the Appellate Court. • For some years the Corporation revenues suffered annually to the extent of about Rs10,000, but Act III. of 1899 was more explicit on the question, and restored this source of revenue to the town.

Collection of Revenue.—The collection of the taxes for many years proved costly and troublesome, and the brief sketch already given of the changes in the organisation of the Department indicates the difficulties experienced in rendering it efficient and honest.

The year 1880 marks the first complete overhauling of the Department, as a result of which the receipts immediately rose from Rs4,53,332 to Rs4,87,660 ; by the end of 1888 the receipts were still only Rs4,94,494.¹

In 1889-90 the amalgamation of town and suburbs caused the license revenue to increase to Rs6,10,461, and the percentage of collections on demand reached what was up till then the highest figure on record, 70 per cent. The methods of collection were, however, unsatisfactory ; the number of prosecutions against defaulters was in this year over 20,000. In 1891-92 some salutary orders were passed in regard to prosecution.

Firstly, ample warning—no less than three notices—was to be first given to the defaulter ; secondly, when a summons had once been applied for, the prosecution was to be pressed, except in cases in which the Chairman had personally ordered its withdrawal. The old procedure, under which an assessee had evaded payment until the issue of process, and had then escaped the penalty of his default by depositing the dues in the Municipal Office, was thus abandoned, and an application for summons, involving as it now did an actual prosecution and delivery of judgment, soon ceased to be an empty threat. Between 1897 and 1899 the receipts were affected by the dislocation of trade which followed on the first outbreaks of plague, but in 1899-1900 the revenue rose to Rs6,88,410 ; prosecutions, however, reached the appalling number of 25,000.

Additional inspectors were now appointed for the working of Act III. of 1899, and the very salutary substitution of a procedure of distraint for the system of wholesale prosecutions, led to a marked improvement in collections.

¹ The financial year 1882-83 shows receipts of Rs6,12,377, but the period covered is fifteen months, owing to the change in the *official* or *financial year* introduced by Act I. of 1882 ; from that time the official year extended from April to March instead of from January to December.

In 1900-1 the receipts were Rs6,93,884, and in 1902-3 they rose to Rs7,19,207. The third and last reorganisation of the Department in 1903-4 led to more careful assessments and more energetic collections; the joint-stock companies already referred to were brought under assessment, bicycles were taxed, itinerant vendors and 'squatters' were made to contribute to the revenue, and taxes under sections 198 and 466 were realised in respect of the same business.

The decade commencing in 1903-4 and ending in 1913-14 has shown a steady growth of revenue, which in the latter year (exclusive of receipts under the Fire Brigade Act) amounted to Rs11,48,800.

License Manual.—A most useful Manual for the guidance of the Department was compiled and issued in 1906-7, under the supervision of the Deputy Chairman.¹ It revised, improved, and stereotyped the procedure of the Department, defined the duties of each class of officer, and elucidated the difficulties of particular cases. The improvement in this Department in recent years must be attributed in part to this valuable guide, which has not only standardised procedure, but thereby fixes responsibility in the event of negligence or wilful disregard of orders.

Appeals.—Appeals against assessments to license tax on trades and professions may under the Act be made either to the Small Cause Court or to a Bench consisting of the Chairman, Vice-Chairman or Deputy Chairman, and three Commissioners—on condition that the tax as assessed has first been deposited, pending the hearing, with the Corporation.

HACKNEY CARRIAGES AND CARTS

Early Legislation.—The official control of carts and hackney carriages plying in Calcutta begins with Act XXI. of 1857 and Act XLVIII. of 1860, which empowered the Police to make regulations as to speed, for the prevention

¹ Mr. C. F. Payne, I.C.S., now Chairman of the Calcutta Corporation.

of cruelty to draught animals, and for compelling lights to be used at certain hours. The monopoly enjoyed by certain native livery stable keepers led however to exorbitant fares being exacted, and the Commissioners moved Government to place hackney carriages under control in the matter of fares, conduct of drivers and stands for vehicles, as was done in London and Paris. The stated objects of Act I. of 1864 were, 'To restrain the extortion of native livery stable keepers, provide a regulated scale of fares, and otherwise to place the relations between the carriage-hiring community and the owners and drivers of gharries on a satisfactory footing.'

Under this Act a Registering Officer was to be appointed by Government to keep a register of all hackney carriages, divided into three classes, of which the first was confined to carriages belonging to coachbuilders, hotel keepers, or livery stable owners, which did not ply for hire on the public streets. A scale of fees (Rs3 for first-class carriages and Rs2 for the other classes) was prescribed, and each carriage was to have a plate specifying its number and class. Provision was also made for regulating fares, for fixing stands, and for licensing drivers.

A year's working of the new Act revealed several defects, *e.g.* its omission to provide against the refusal to ply for hire, and the absence of any provision relating to *palankeens*.

Act V. of 1866 was accordingly passed to remedy such deficiencies in the old Act.

- In 1878 it was decided to substitute the control of the Corporation for that of the Commissioner of Police, and by Act IV. of that year the Municipal Commissioners were authorised to appoint the Registering Officer and to administer the Act.

The change in management did not, however, at first make for efficiency, and public dissatisfaction with the hackney carriage service grew stronger. In 1890 the Corporation appointed a committee to inquire into the working of the Act and to suggest amendments where necessary. An amending Act (II. of 1891), incorporating the committee's proposals, was drafted and passed by the Bengal Legislature with unusual promptness. It

still remains the law on the subject, and its provisions may be briefly described. In the first place, the Corporation was vested with the entire responsibility of working the Act. Secondly, the receipts of the Department were to be credited to a separate fund, and the excess over expenditure was to be divided in fixed proportions between the Corporation and other municipalities concerned. Thirdly, the dual control exercised by the Corporation and the adjoining municipalities over hackney carriages plying between their respective jurisdictions was done away with, the Local Government taking powers to bring by notification any area in the vicinity of Calcutta within the operation of the new Act. Fourthly, the 'registration year' under the new Act was to begin on the 1st October instead of on the 1st April. And lastly, the Corporation was authorised, subject as usual to the approval of Government, to frame bye-laws,¹ prescribing *inter alia* the qualifications of drivers, the dimensions of carriages, and the measurement of horses.

Notifications were published by Government on the 13th December 1892 and the 20th May 1893, bringing certain municipalities and areas within the scope of the Act, which at the present time applies to the following places:—

Howrah	Municipality.
Bally	do.
South Suburban	do.
Garden Reach	do.
Tollygunge	do.
Manicktollah	do.
Cossipore-Chitpore	do.
Baranagore	do.
Kamarhatti	do.
North Dum-Dum	do.
South Dum-Dum	do.

In 1913-14 the surplus of actual receipts over actual payments amounted to Rs15,820, of which the Corpora-

¹ Bye-laws were first framed in 1891 and amended in 1903 and 1906. It is of interest to note that the important question of the *dimension* of carriages was first brought to the notice of the Corporation by the Howrah Municipality.

tion received as its share Rs10,630, the balance being divided among the other municipalities.

Proposals for the Amendment of the Act.—The necessity of amending the Act has been repeatedly urged by the Commissioners since 1895, and their latest proposals are now pending before Government. There can be no doubt that the hackney carriage service has been improved within recent years, but several reforms which have commended themselves year after year to Corporation committees have been blocked by defects or omissions in the Act, and it is essential that the powers of the Registrar should in certain matters be increased.

In 1914 Government proposed that hackney carriage drivers should be licensed by the Commissioner of Police instead of by the Registrar of Hackney Carriages, but the Corporation did not favour the proposal, on the ground that such dual control must tend to diminish responsibility and create friction.

Carts and Hackeries.—The registration of these vehicles, if plying in the streets of Calcutta, was made obligatory by Act XXVIII. of 1856, but prepayment of fees was not compulsory, and the attempt to realise the dues by seizing and selling the carts or hackeries was not only unpopular but also ineffective. Under Act VI. of 1863 a half-yearly registration fee of Rs4 was made payable at the time of registration. Act IV. of 1876 prescribed the payment of one-sixth of the total surplus of receipts over expenditure to the South Suburban Municipality, and one-twelfth to the Municipality of Howrah—subject, however, to the discretion of the Local Government to alter at any time these proportions.

By the Act of 1888 Government was empowered to distribute the total net proceeds of the fees—after deduction of the charges incurred on account of the registration—between the Corporation and the Howrah Municipality, and such other municipalities adjacent to Howrah or Calcutta as might seem entitled to a share in such proceeds, and this arrangement was continued under Act III. of 1899. The net proceeds of the registration fees

are, under Government orders, divided in the following proportions :—

Calcutta,	$\frac{31}{36}$;
Howrah,	$\frac{3}{6}$;
Cossipore-Chitpore,	$\frac{1}{4}$;
Manicktollah,	$\frac{1}{4}$;
South Suburban Municipality,	$\frac{5}{8}$;
Garden Reach,	$\frac{1}{8}$.

Under this scale Calcutta received Rs81,766 from the Cart Registration Fund in 1913-14, which left Rs13,188 to be divided amongst the other municipalities. The total receipts amounted to Rs1,13,907 and working expenses to Rs18,953.

Staff and Organisation.—The registration of carts and hackeries, as we have already seen, was in the beginning carried out by the Municipal Commissioners, although hackney carriages were originally registered by the Commissioner of Police. In 1867 for a brief period the former work was transferred to the Police, but in the following year the combined registration branch was made over to the Municipal License Officer; the amalgamation did not work satisfactorily, and the Police again assumed charge of the registration of hackney carriages, which was however under Act IV. of 1878 formally transferred to the Municipality.

Between 1880 and 1891 the License Officer discharged the duties of Registering Officer, but in the latter year the Hackney Carriage branch was constituted into a separate department with a whole-time Registrar. In August 1901 a big strike occurred amongst the carters and hackney carriage drivers, and a Resolution dealing with certain issues raised by this occurrence was issued by the Government of Bengal in the following September. The special committee appointed by the Corporation to deal with the matters discussed in the Resolution, while recommending that the Corporation should retain its control over the Department, recognised that some radical improvement in its administration was essential, and a Registrar on a salary of Rs300-400 per mensem

was appointed, with a staff of responsible inspecting officers.

The registration of carts has naturally presented less difficulty than the regulation of the hackney carriage service, and for many years after the separation of these very different, though superficially similar functions in 1868-69, the registration of carts was entrusted to two clerks of the License Department. A numbered plate was at first fastened on to each cart, but in 1879 the present practice of branding numbers on the carts was adopted.

The officer in charge of the cart registration branch was in 1903-4 given the designation of Deputy License Officer ; his orderlies are sent out each day to seize unregistered carts and to bring them to the office for registration—a duty which was formerly performed by police constables.

Funds and Accounts.—Under Act V. of 1866 the Lieutenant-Governor of Bengal was competent to dispose of all fees and penalties levied under the Act, and he directed that they should be credited to Government. In 1875 this arrangement was modified, and three-fourths of the surplus fees and fines levied under this Act were placed at the disposal of the Commissioner of Police for the construction and maintenance of hackney carriage stands.

The *Hackney Carriage Fund* was created by section 60 of Act II. of 1891 for carrying out the purposes of the Act, and we have seen that the municipalities brought under its operation are entitled each to receive a share of the net receipts in proportion to the gross receipts accruing to the fund from each municipality, the Corporation being entitled to retain the balance of the net receipts.

A separate fund is also kept in respect of the registration of carts, although not prescribed by statute. The following Table shows the number of hackney carriages, drivers, and carts registered for each quinquennial period since Act I. of 1864, and the revenue obtained therefrom :—

Year.	Number of Hackney Carriages.	Drivers.	Fees. ¹	Carts.	Fees. ¹
			Rs.		Rs.
1864	.....	.....	.....	8,191	32,688
1870	.....	.....	.....	6,031 (half-year)	39,858
1875	.....	.....	.....	12,104	48,416
1878 ²	2429	159	10,034	.....	.....
1880	1690	2057	.....	15,042	45,509
1885	1265	1687	.....	17,844	49,185
1890	1459	1825	.....	17,927	55,891
1895	2454	3725	.....	19,453	57,649
• 1900	1986	3942	.....	20,481	61,002
1905	1908	3936	4,152	23,985	69,764
1910	1769	3384	9,338	27,730	81,583
1915	3060	4959	6,072	26,942	77,833

RECORD ROOM

Early Arrangements.—Prior to the construction of the new Municipal Office there was no regular Record Room, with the corollary that the record system—if it could be called a system—was hopelessly inadequate. In 1872 a crude procedure termed the ‘bundle’ system was in force, under which all letters, whatever their subject, were numbered consecutively and kept in bundles; a letter could only be traced through the index register kept by subjects.

In 1892-93 the ‘collection file’ system was introduced, papers being classified according to subjects, and separate files with separate numbers being formed under each group. There was a multiplicity of registers and an unnecessary accumulation of records, since no provision was made for the periodic destruction of useless or unimportant papers. In the Secretary’s Department papers after disposal were handed over to a record keeper, but

¹ The fees shown are the Corporation’s share of the surplus of receipts over expenditure. Act II. of 1891 provided for a division of the surplus of hackney carriage revenue between the Corporation and neighbouring municipalities; Act IV. of 1876 and the succeeding Acts made similar provisions in respect of cart registration fees.

² The Hackney Carriage Department was transferred to the Municipality from the Police in August 1878.

they were not arranged nor indexed; in other offices papers were allowed to accumulate without being dealt with under any kind of record system.

Modern System.—In 1904 a central Records Department was created, and the old papers of all departments were collected and arranged. In the course of three years about 350,000 files were indexed according to the card index system,¹ and an even larger number of useless papers destroyed. The indices were compiled on two systems—(1) according to a local classification, and (2) according to subject. It was found that a large number of papers could most conveniently be grouped according to the wards, streets, and premises to which they related, and this method of classification, which has the merit of simplicity, was followed as far as possible.

The number of files however relating to matters of a general nature is considerable, and they can only be indexed according to subject. The classification of records according to the period for which they should be preserved gave rise to difficulties.

Five divisions were originally adopted, but in 1907 the classification was simplified and revised as follows :—

- A papers—to be preserved permanently
- B " " " for 12 years
- C " " " for 2 years
- D " to be destroyed immediately after disposal.

A complete classification list drawn up on this principle, for all papers ordinarily dealt with in the various departments, is contained in the very useful and comprehensive Manual of Office System, by which the office procedure is regulated.

Only records classed A or B are sent to the Record Room, A class records being bound up in a blue cover, and B class records in a red cover, which renders it easy for the Record Keeper to pick out the B class cases for

¹ Under this system each department or section or branch of a department which keeps its papers separately, has a card index cabinet with drawers labelled (a) with the names of wards or streets, or (b) with the main head or alphabetical guide or catchword to the *subject* indexed.

destruction at the end of twelve years. All records destroyed are duly registered with the necessary references.

Record Room.—This consists of two blocks, one in the west and one in the east wing of the office building.

Each block has four floors, which are numbered as sections of the Record Room. The racks in each section are distinguished by letters, and each shelf in the rack is numbered. Papers are found by reference to their section rack and shelf numbers, which are noted in the Records Register as well as on the index cards. All recorded papers are done up in bundles between two teakwood boards, which are clearly labelled with the case numbers, or collection or file numbers of the records contained in them.

The records are then placed vertically on the shelves. The Record Room is now a model of system and order, and the Corporation may feel just pride in this institution which has replaced the chaotic muddle of a few years back. The organisation at headquarters has always been admirable, and the machine works with Teutonic efficiency, but in the numerous departments of the Corporation the personal factor finds more scope; 'improvements' on the system—usually reversions to the more laborious but less exacting system of old—constantly creep in, and careful annual office inspections are necessary to enforce a rigid adherence to the rules laid down in the Office System and the Records Manuals.

The labours of the Central Records Staff are indicated by the following Table :—

FILES CONSIGNED TO CENTRAL RECORDS BRANCH.

1910-11.	1911-12.	1912-13.	1913-14.	1914-15.
14,672	15,050	18,078	18,295	26,043

RECORDS ISSUED TO OTHER DEPARTMENTS.

1910-11.	1911-12.	1912-13.	1913-14.	1914-15.
3,180	5,028	5,137	6,858	7,182

In 1914-15 (apart from files proper), 14,506 other documents, viz. sanctioned building plans, estimates, registers, etc., were consigned to the Record Room. •

PENSION AND PROVIDENT FUND

Though not a 'department,' the working of this fund is perhaps more properly included in this chapter than under the head of Finance and Accounts. Section 39 of Act IV. of 1876 first authorised the Commissioners to make rules for the grant of pensions and gratuities to municipal employes, and the original rules were framed in April 1877. They were modified in 1895,¹ and officers eligible for pensions were required to contribute to pension according to a certain scale. Some modifications in these rules were made in subsequent years, viz. in respect of the calculation of average salary and compensation pension in 1904, of qualifying leave in 1907, and of pensions to persons re-employed after retirement in 1909.

The pension system was abolished with effect from January 1902, and the Provident Fund system, authorised by section 49 of Act II. of 1888 and section 73 (c) of the present Act, was introduced.

Under the Provident Fund rules sanctioned in 1902,² every whole-time and municipal officer is liable to pay 5 per cent. of his salary as a compulsory deposit, to which an equivalent amount is added by the Corporation out of municipal funds.

¹ Government Notification, No. 225 T.M., dated 24th August 1895.

² Government Notification, No. 1987, dated 2nd August 1902.

A voluntary deposit not exceeding 5 per cent. of the salary may also be made by the employé, but no corresponding contribution is in this case made by the Corporation.

The deposits are held and invested in the name of the trustees under certain conditions. The trustees are four in number, of whom two—both of them Commissioners—are appointed annually by the General Committee ; of the others one is the Chairman, and one some other responsible municipal officer elected by the subscribers. The management of the fund is entrusted to the Chief Accountant *ex officio*, subject to the general control of the Corporation. The total sum held on subscribers' account on the 31st December 1913 was Rs5,90,048, and the total number of subscribers was 962.

CHAPTER III

DRAINAGE

IN the historical sketch of the growth and development of municipal government in Calcutta, it has been shown that the crucial problem which confronted each system of administration was to achieve efficiency in drainage and conservancy. From the earliest times the administration had acknowledged the insanitary conditions of the town, and striven to ameliorate them by local and partial reforms; the slender resources of the municipality had proved an inexorable barrier to any bold and comprehensive scheme of improvement. The pioneers of municipal government had been forced to confine their efforts mainly to the improvement of what would now be termed the conservancy of the city—the cleansing of its streets and the prevention and removal of nuisances—but they were constantly reminded that the scavenging of a city, so thickly populated and hedged in by a river and a swamp, was mere digging of the sands, until a comprehensive scheme of drainage had been introduced. In this chapter it is proposed to trace the steps by which our modern system of drainage grew up, and in Chapter IV. to describe the development of the conservancy of Calcutta.

Lord Wellesley's Minute 1803.—Lord Wellesley's famous Minute is a terse but comprehensive survey of the wide field which Calcutta offered to the activities of its administrators at the beginning of the nineteenth century. He assigns chief importance to the improvement of its drainage. 'The construction of the Publick Drains and Water-Courses of the Town is extremely defective.' In their present state they 'neither answer the purpose of cleansing the Town nor of discharging the annual inundations occasioned by the rise of the River, or by the excessive fall of rain during the South-West Monsoon. . . . The defects of the climate of Calcutta during the latter

part of the rainy season may indeed be ascribed in a great measure to the state of the Drains and Water-Courses, and to the stagnate water remaining in the Town and its vicinity. The health of the Town would certainly be considerably improved by an improvement of the mode of drainage and cleansing the Streets, Roads, and Esplanade. An opinion is generally entertained that an original error has been committed in draining the Town towards the River Hooghly. And it is believed that the level of the country inclines towards the Salt-water Lake, and consequently that the principal channels of the Publick Drains and Water-Courses ought to be conducted in that direction. Experience has manifested that during the rainy season, when the River has attained its utmost height, the present drains become useless; at that season the rain continues to stagnate for many weeks in many parts of the Town, and the result necessarily endangers the lives of all Europeans residing in the Town, and greatly affects our Native Subjects.'

The Governor-General, after enumerating other defects in the municipal administration, which in his opinion required immediate notice, proceeded to appoint a strong committee to consider and report to His Excellency in Council the means of improving the town of Calcutta, with (amongst others) the following instructions:—

- (1) To make a survey of levels and to ascertain what alteration might be necessary in the direction of the public drains.
- (2) To examine the relative level of the river in the rains, as compared with the level of the drains.
- (3) To suggest what description of drains or water-courses would prove most efficient (*a*) to prevent rain-water stagnating in Calcutta and its vicinity, and (*b*) to cleanse the town.
- (4) To report what establishment seemed necessary for cleansing and maintaining in repair the drains and water-courses.

He promised that the means of raising the necessary funds, without (he believed) any heavy tax being imposed



Photo by R. B. B. & Co. Calcutta

• GOVERNMENT HOUSE, CALCUTTA

on the inhabitants of Calcutta, would 'claim the early and deliberate consideration of Government.'

The records of this committee's proceedings are not available; they were apparently transferred to the Lottery Committee in 1817, but Mr. H. J. Shakespear, a member of the latter body, was unable to find them in 1820. Some account of the important works executed by Lord Wellesley's Improvement Committee appointed in 1809, and by the better known Lottery Committee, which was appointed in 1817 and appears to have dissolved about 1836, has already been given. It will suffice for the purposes of this chapter to state that apart from the construction of the Beliaghata Canal (1810) and Lieutenant Schalch's survey of the town,¹ the special problem of drainage had been barely touched when the Fever Hospital Committee began its enormous labours.

Fever Hospital Committee.—They commented their inquiry by the examination of 'practical Engineer Officers,' and 'from the information and opinions thus obtained' were able 'to report with perfect confidence that there is no natural obstruction whatsoever to the establishment in the City of Calcutta of a system of Drainage and Cleansing, adequate to the rendering it dry and free from soil and impurities.'

There could be no difficulty in establishing the urgent need of such a system.

Lieutenant Abercrombie, Superintendent of Conservancy, gave a description of the abominable drains in the northern part of the town. They were unpaved, and the labours of the coolies, who were continually employed in digging out in a haphazard way the black mud and filth which obstructed their flow, merely succeeded in accentuating their inequalities. The drains were often cleared at great labour by bundles of straw, twisted into hard ropes, 6 or 9 inches in diameter, and dragged by coolies along the bottom, but in the absence of any fall or constant flow of water the relief was temporary.

¹ He proposed in 1821 to construct large masonry sewers from the river to the proposed Circular Canal to carry all the refuse and filth of the town as well as to drain it, into the Salt Lakes.

The bottom of the drain was sometimes nearly two feet below its supposed outlet, and its deposit of five or six inches of filth (which was removed in carts), consisting chiefly of the contents of privies and other matter in every stage of decomposition, gave off, when disturbed, so disagreeable a stench that it was questionable whether it was prudent to arouse its latent offensiveness.

One witness spoke of the drains as 'merely irregular furrows in the soil without any brickwork . . . continually left in a most filthy uncleaned state, emitting the most noisome effluvia, doubtless highly pernicious to the health of the inhabitants.'

Some of the committee inspected the northern part of the town and described the abominations known as 'kennels,' still a familiar sight in some parts of Calcutta. Deep drains with brick walls and a heavy deposit of filth, on which stagnant and evil-smelling water found a lodgment, were covered over, at distances of 1 to 2½ feet apart, with platform structures used as shops; the space between the top of the drain and the platform was closed at the front, and the only means of cleansing these sloughs of despond was provided by small gaps which were often ten feet apart. After even a light fall of rain the 'kennels,' having no outlet, overflowed and the streets were covered with water a foot deep, which took often a whole day and rarely less than eight hours to run off. Dr. W. Graham stated that after a heavy fall of rain a canoe was the 'preferable mode of transit' in Chitpore Road, and being asked to point to some healthy situation in Calcutta, and draw a moral from its peculiarities, he stated that 'he had never found amidst the wilderness the green spot in which the philanthropist could repose and exclaim *hic sanitas*!' It is, perhaps unnecessary to cull further evidence from the committee's voluminous report on the iniquitous sanitation of old Calcutta.

Proposals for Underground Drainage.—The committee came promptly to the firm decision that the only satisfactory remedy was a system of underground drainage. They were supported in this view by most of their expert witnesses, although Captain Prinsepp was of opinion

that the want of a constant flow of water through the sewers, unless artificially produced by pumping at a cost which was far beyond the resources of such a town as Calcutta, would render any sewerage scheme imperfect and a more dangerous remedy than the disease. The alternative was a system of surface drainage to carry off the water—estimated by Captain Thomson at over 7 lakhs—with sinks and ash-pits for every house, to be cleansed by hand-labour. Captain Prinsepp, who had an intimate knowledge of the inconveniences arising from the somewhat ambitious but badly executed sewerage system of Benares, was on the whole strongly opposed to any scheme of underground drainage in Calcutta. The committee was however convinced that nothing but a system of underground drainage could be permanently satisfactory in a city so extensive and so thickly populated.

In 1835 Mr. Blechynden, Superintendent of Roads, had the courage to jettison his original theories, which aimed at draining Calcutta towards the Hughli; he proposed instead to drain the northern portion of the town, in which no large drains had yet been made, either towards the river or to the east, by a large underground tunnel running from the Hughli down Nimtola and Manicktollah streets to the Circular Canal. The tunnel was to be flushed by the admission of the Hughli water.

Captain Thomson, an Engineer officer in charge of the canals, had also devoted some thought to the drainage of the city. His scheme, which was carefully examined by the committee, provided for an elaborate system of large underground drains or sewers, which he proposed to flush partly by river water and partly by means of a reservoir to be formed at the western end of the Entally Canal.

Captain Forbes' Scheme.—The committee, however, was more attracted by the rival scheme of Captain Forbes, R.E. He considered that whether the site of Calcutta had been originally chosen by accident or design, it was from the drainage point of view well chosen, inasmuch as the lowest part of it was, according to Schalech's survey, $8\frac{1}{2}$ feet above the highest level of the Salt Lakes.

Briefly, he proposed to construct a large masonry

aqueduct from the river at the old Chitpore Bridge to the old Park Street cemetery, and communicating with the Salt Lakes by a wide, open canal nearly parallel with the Entally Canal. The aqueduct was to be connected by sluice-gates with the river and the lake, so that water might be admitted or excluded from both these sources. On either side of the aqueduct a masonry sewer or covered drain was to be constructed, and linked up with a system of subsidiary drains discharging into these two main sewers all the filth and surface drainage of the city. The two side or main sewers were to be connected at a low level with the aqueduct, which was to act as a reservoir containing a head of water for scouring the sewers, this head to be maintained at different times from the rise of the tide in the Salt Lakes and at other times by the tides of the river. During the rains the aqueduct or reservoir, equally with the sewers, could be utilised for draining off the rainfall, and it was expected that by opening it for the navigation of small boats or 'saltees,' a considerable revenue in tolls might be obtained. The water in the aqueduct, by reason of the communication with the Salt Lakes, would not ordinarily be suitable for drinking or culinary purposes, but could be utilised for watering the roads, for washing or bathing, and for extinguishing fires. A system of subsidiary aqueducts, supplied by water pumped up from the river, was included in the scheme for the purpose of flushing the subsidiary drains in the dry months.¹

The industry and zeal of the Fever Hospital Committee secured no practical results in the matter of drainage, and for many years to come the *non possumus* of finance proved a sufficient bar to all such reform.

Clark's Scheme.—On the 29th December 1855, the Municipal Commissioners, in recommending Mr. Clark's scheme for the approval of Government, referred to the scheme of 'the late lamented Major-General Forbes' as 'the only plan at all approximating to completeness,

¹ It was suggested that Captain Forbes' scheme might be financed by a public loan on the Tontine system—profits to be divided amongst subscribers until the demise of the last survivor, when the income was to lapse to the city!

which had ever been proposed for the drainage of Calcutta.' They pointed out, however, that the rapid growth of the town had now rendered the General's scheme impracticable, as the cost of the new street along which his canal was to run could not be placed at less than 14 lakhs.

Mr. Clark's original report was submitted to the Municipal Commissioners on the 20th November 1855, and forwarded a month later to the Local Government. The report was based on the plans and levels prepared by Major Schalch, the Report of the Fever Hospital Committee, Simms' plan of Calcutta, and the papers left by the late General Forbes. The estimated cost of the scheme was $26\frac{1}{2}$ lakhs. In March 1856 a committee was appointed by Government to consider the scheme, and in June 1857 they recommended its adoption with certain modifications. The estimate for drainage was increased to roughly 33 lakhs, while the introduction of a diffused water supply, which was declared to be an indispensable adjunct to any scheme of underground drainage, was estimated to cost $11\frac{1}{2}$ lakhs.

It was proposed to spread the expenditure over a period of ten years, and section 25 of Act XXVIII. of 1856 made it obligatory on the Commissioners to set aside annually $1\frac{1}{2}$ lakhs of rupees from the proceeds of the $7\frac{1}{2}$ per cent. house-rate, in order to repay with interest charges the loans raised for these works.

Section 26 of the same Act authorised the subsequent levy of a $2\frac{1}{2}$ per cent. drainage-rate on all lands and houses which should fall within the scope of the sewage and drainage scheme. Between March 1858 and March 1859—on the recommendation of the Government Drainage Committee—an elaborate series of levels were taken throughout the town, and careful tidal observations were made at Chitpore, Dhappa, Bamunghatta, Tongra, Tolly's Nullah, and Chandpal Ghât. The Kotrung brick-field was acquired in 1858, and brick-making machinery was ordered from England, in order that work might begin as soon as final sanction to the scheme had been obtained.

Rendel's Proposals.—In April 1858 Government pro-

posed that the whole scheme as approved by its committee should be submitted for examination to some engineer of eminence in England. Mr. M. Rendel¹ of Messrs. Rendel Brothers, Sanitary Engineers, Westminster, happened to be in India at this time, and his opinion was invited. Their report, together with a scheme of their own, was however not received until December 1858, after Mr. Rendel's return to England. It is interesting to find that the two schemes exhibited material differences. In Clark's scheme the sewers provided for the area bounded by Circular Road and the Hughli and gravitated to Entally, where the sewage was to be pumped and delivered at a higher level to the Salt Lakes; according to the Rendels' scheme, the same area would be served by sewers gravitating—without pumping—*direct into the Hughli*. They advised that Clark's scheme, with certain 'important modifications' as regards the manner in which smaller sewers should join the larger and increased pumping power, was the best that could be devised for draining the city to the Salt Lakes, but preferred their own alternative of draining to the river.

Briefly their idea was to construct six large sewers—of which two were to have a common outlet—running westwards through the city from the Circular Canal to the Hughli. The inverts at the Canal end were to be 10 feet and at the Hughli 5 feet above Kidderpore Dock Sill, and seeing that (1) some of the ground levels of the city round Amherst Street are 18 feet above and other portions of the Canal area are only 14 or 15 feet above this datum of Kidderpore Dock Sill, while (2) the ordinary spring-tides in the Hughli rise to 19 feet, and extraordinary tides to 20 and 21 feet, it was clear, if other effective measures could not be devised, that when a heavy rainfall occurred just before such tides, the water would pond up several feet deep in the low parts of the city, until the river ebbed sufficiently to admit of a flow off. This difficulty they proposed to provide against by furnishing the Hughli and Canal outlets with automatic flap valves. During heavy rainfalls therefore the

His father was an engineer of great reputation.

storm-water would flow both to the Hughli and Canal ; and when the Hughli outlets were blocked by the tides the Canal outlets would continue to discharge, because the tides there were found to rise not higher than about 12·00 above datum. This scheme avoided pumping altogether, as during the time the Hughli outlets were tide-locked it was intended that the sewers should act as storage reservoirs, discharging themselves when the ebb tide fell to the required level. The estimated cost was Rs38,65,000. Whatever the merits or defects of this project, the Commissioners after studying Clark's elaborate criticism, recommended his own scheme for the approval of Government, whose sanction was finally obtained on the 20th April 1859. Clark's scheme, as finally approved, was a combined system, carrying off both rainfall and sewage ; as already stated, the drainage was from the Hughli to the Salt Lakes and the sewage required to be pumped.

Clark's Scheme described.—The scheme comprised five main sewers, their branches, accessories, and outfall works. Three of the main sewers stretched from the Hughli to the Circular Road, one along Nimtola Ghât Street having its invert at the Hughli 13 feet and at the Circular Road 9·00 above datum ; one down Kolutola Street and one down Dhurumtollah Street with inverts at the Hughli at about 12 feet and at Circular Road about 9·50 and 5·34 above datum respectively. There were two main intercepting sewers, one from the north, starting from the Hughli at Sova Bazar Street at a level of 13 feet, running eastward to Circular Road and continuing along Upper Circular Road to a level of 5·34 at Dhurumtollah junction. It intercepted the three main sewers already mentioned. Between this Circular Road sewer and the Circular Canal he provided four storm-water overflows of much larger capacity than the sewers. The other intercepting sewer started from Tolly's Nullah, near Zeerut Bridge, with an invert level of 12 feet, and following Lower Circular Road to Dhurumtollah junction, which it joined at a level of 5·34, it discharged together with the sewer from the north and the

Dhurruntollah sewer through a main outfall, 15 ft. 6 in. by 15 ft. 9 in., to Palmer's Bridge Pumping-Station in Entally, and thence into the Beliaghata Canal. These mains were egg-shaped, 6 ft. 6 in. by 4 ft. 4 in. at the river end, increasing to 9 ft. 4½ in. to 7 ft. 3 in. at the Dhurruntollah junction, and had a fall of 4 feet per mile, gradually decreasing to 2 feet per mile at the outfall, with a velocity when flowing full of between 3 and 4 feet per second. They and their outfall sewers were constructed *invert to invert*. At Palmer's Bridge the invert level was 5·00 above datum and 3 feet below the low-water level of the Salt Lakes, which fell to 8·00 above K.D.S.¹ It was estimated that the maximum quantity of sewage that would be delivered at this point would be 45 cub. ft. per second from a population of 500,000, but as this was not considered sufficient of itself to induce a self-cleansing velocity along the invert or 'bottom' of the sewers, an additional quantity of 21 cub. ft. per second of river water was to be admitted from the Hughli and Tolly's Nullah, or a total of 66 cub. ft. per second, to provide a self-cleansing velocity of 2 feet per second during the dry weather. The surface level at which this quantity would with a free flow arrive at Beliaghata Canal would be about 7·50 above datum, and consequently below the low-water level of the Salt Lakes. It was decided therefore to provide pumping power at Palmer's Bridge sufficient to lift that quantity of sewage 14 feet into a high-level sewer, which would convey it for a distance of two miles to Tangra Creek. The sewers were intended to have a capacity equivalent to a ¼ in. of rainfall per hour or 69,000 cub. ft. per minute, including sewage from the area of about 4600 acres drained. This scheme, including 30 miles of brick and 79½ miles of branch pipe sewers, pumping-station, gullies, penstocks, surface channels, outfall, high-level sewer, land and establishment, was estimated to cost just over Rs34,00,000 and, as already stated, was sanctioned by Government in 1859, unfortunately without the modification recommended by Messrs. Rendel in regard to the manner in which one sewer

¹ K.D.S. = Kidderpore Dock Sill.

should join another. They pointed out that the obvious method of executing sewer junctions was to build the main sewer with a drop, so that the surface level of the increased quantity flowing in the forward portion of the sewer would not rise above the surface level of that freely flowing from the sewer above or that in the branch sewer.

It is a serious defect in the Calcutta sewers that both branches and mains are built invert to invert. They should have been built top to top or soffit to soffit, or at any rate so that the natural free flowing surface level of the maximum sewage flow in the branch and main sewer should coincide at the junction, even at the expense of deeper outfalls.

Hyde's Report 1868.—It was decided to complete the Dhurumtollah main sewer before commencing other portions of the scheme, in order that the general correctness of Clark's views might be tested. In 1862 some uneasiness as to the efficient construction of this sewer and the ultimate success of the scheme became evident amongst the Commissioners, who were however reassured by the confident report of Captain Hyde, whom Government appointed to examine into the quality and probable efficiency of the work already done, the advisability of completing the scheme, the injury likely to be caused to house property by the excavation of sewers in narrow streets, and lastly, the ultimate disposal of the sewage.

The completion of the main sewer from Tolly's Nullah to the main junction at Dhurumtollah, the high-level and the outfall sewers, and the pumping-station enabled Clark's scheme to be brought into operation in 1868 in the area south of Park Street.

Extension of System to Northern Division.—The question of extending the works to the northern division of the town then began to be agitated. A special committee to consider the subject was appointed by the Justices, and elaborate reports were obtained from Mr. Leonard, then Consulting Engineer to the Municipality, and from Dr. Macrae, Officiating Health Officer. Both officers having reported most favourably on the works already completed, and having strongly advocated their extension,

the Justices decided to construct the main drains between Dhurumtollah and Kolutola, and this work was carried out by Messrs. Burn and Co.

In January 1871 the advisability of extending the drainage system to the northern portion of the town was again discussed. Resolutions were passed declaring that the scheme, so far as it had been brought into operation, had proved a 'decided success,' and the expediency of extending it over the whole of Calcutta was admitted.

• In March 1871, however, some differences of opinion became evident ; Mr. Clark, supported by the European Justices, was anxious to carry out his scheme in its entirety, while the Chairman urged a more cautious policy. He contended that the success already achieved in the less crowded European quarter did not afford sufficient ground for believing that a deep drainage scheme could be safely carried through in the narrow congested streets of northern Calcutta, and he advised that 'the sewers of the first and second class' should be laid throughout the town, so that no locality should be more than 1000 feet from a main sewer, that 'gradually, as funds' were available, each area should be taken in hand, improved and drained, on the plan which might be considered the best, due regard being paid to any peculiar features of the streets and the wishes of the inhabitants.'

The Indian Justices, alarmed at the heavy expenditure which the complete scheme must involve, and by no means convinced of its ultimate success, were disposed to accept Sir Stuart Hogg's view. It was finally decided to form a Committee of Experts and to associate with them some of the Native Justices, along with the Chairman, Engineer, and Health Officer, for the purpose of reporting on the best means of draining the northern division, 'with due regard to efficiency, economy, and the habits of the population.'

The experts,¹ after carefully inspecting the areas

¹ Mr. G. Sibley, Chief Engineer, E.I.Ry. ; Mr. T. S. Isaac, Superintending Engineer. Presidency Circle ; and Mr. C. H. Denham, Deputy Chief Engineer, E.I.Ry.

within the operation of the new drainage scheme and the most congested portions of the undrained area, pronounced the scheme to be thoroughly efficient, and recommended that if funds permitted it should be carried out in its entirety.

They estimated roughly that the cost of completing the scheme could not be safely put at less than 56 lakhs, in addition to the 50 lakhs already expended. The Justices decided that they were not justified in burdening the Municipality with so heavy a debt, and that the more prudent course was at present to construct all the main sewers, and to improve the old drains lying between these sewers, as far as circumstances and funds might permit. Act I. of 1872¹ was passed, increasing the borrowing capacity of the Justices by a further 30 lakhs, and a loan of Rs21,20,000 was obtained from Government at an interest of $4\frac{1}{2}$ per cent. and with a sinking fund of 2 per cent. It may be noted that some portion of the work was carried out very economically by departmental agency.

Completion of Scheme.—It appears to have taken sixteen years to complete the main sewers of Clark's scheme. By 1875 nearly 38 miles of brick and 37 miles of stoneware pipe sewers are said to have been constructed. The pipe sewers vary in diameter from 6 in. to 18 in., and the masonry sewers from 24 in. diameter to 9 ft. $4\frac{1}{2}$ in. by 7 ft. 3 in. egg-shaped section.

- The pumping plant at Palmer's Bridge comprised two 30 and one 45 P.H.P. vertical centrifugal steam pumps by Messrs. Easton and Anderson, capable of raising through a lift of 14 ft. 66 cub. ft. per second, or say 4000 cub. ft. per minute, to the old high-level sewer, which is capable of conveying about 5000 cub. ft. per minute from Palmer's Bridge to Tangra Creek (now better known as the old sewage channel in the square mile). At Palmer's Bridge

¹ Under Section 9 Act IX. of 1867, the Justices were precluded from borrowing by debentures or otherwise more than 55 lakhs of rupees—exclusive of the loan of 52 lakhs obtained from Government on the security of the water supply rate and of the market loan of 6 lakhs. In 1871 the Corporation had already raised on debentures 54 lakhs.

two huge silt-pits were constructed, each 150 ft. long by 15 ft. 6 in. wide, with pits 5 feet below the invert level of the sewer, and provided with penstocks, so that they could be worked alternately for the removal of intercepted road grit. These penstocks also shut off the sewers from the channel to the Beliaghata Canal, and in storms were opened so that the sewers could discharge full bore to the canal. The greatest relief from storm-water, however, was obtained through the storm-water overflows between Upper Circular Road sewer and the Circular Canal.

Mr. Leslie succeeds Clark.—The next stage in the history of Calcutta drainage begins with the preparation in 1875 of plan and estimates for the completion of the works by Mr. Leslie, Clark's successor. The estimates amounted to nearly 19 lakhs, and included all sewers required for public thoroughfares and ditches, along with the construction of footpaths, metalling of roads, and the provision of boundary pillars; they did not however cover the drainage of bustees nor of the small area lying to the north of the town between Baghbazaar and the canal.

In 1875 Government sanctioned a further loan of Rs3,40,000 on the same terms as the loan of 1872. Section 334 of Act IV. of 1876 gave more elasticity to the borrowing powers of the Commissioners, and between 1878 and 1885-86 they obtained further loans of 18 lakhs.¹ The drainage works of the Southern Division were finally completed about 1878 and those of the Northern Division before 1885-86. By 1887-88, prior to the amalgamation of the suburbs, the total expenditure appears to have amounted to over 88 lakhs, excluding the cost of the storm-water drainage, works in the Salt Lakes, and the drainage of certain special areas.

The Canal and Intercepting Sewer.—Clark's original scheme had not been completed when the Corporation was compelled to undertake additional works to prevent the discharge of storm-water into the canal.

The Government of Bengal had long recognised 'the

¹ Drainage Loans :—1878, 4 lakhs; 1878, 2 lakhs; 1879, 4 lakhs; 1885-86, 8 lakhs; 1886-87, 2 lakhs; 1887-88, Rs1,60,000.

anterior right of the town to its drainage' and their right to carry their great outlet drains beyond Circular Road to the outlet of their drainage, *wherever that might be*, and whether or no it might be a cause of material expense to the Canal Department.¹ In 1880, however, the Government Irrigation authorities resiled from this position and objected to the storm-water being any longer discharged into the canal, although there could be no doubt that the canal had intercepted the natural surface drainage channels of the city.

After a long controversy with Government, extending from 1879 to 1881, the Corporation reluctantly agreed to construct an intercepting sewer 7 ft. diameter at the head and 11 ft. diameter at Palmer's Bridge, to increase the dimension of the outfall channel (the Open Cut) to a capacity of about 90,000 cub. ft. per minute, to construct tide-gates of four openings 10 ft. wide at Makalpotta, and to divert the storm-water of the northern area of the city to the Beliaghata Canal below Dhappa, at a cost of some 12 lakhs of rupees, of which Government contributed half.² This intercepting sewer runs parallel with and close to the canal from Halsi Bagan Road to Palmer's Bridge, where it joins the outfall channel, but it has unfortunately been constructed, like most of the city sewers, with the smaller sections joining the larger invert to invert, and although sectionally large enough in itself, the levels at which it has been constructed will not allow it to take the required discharges from the storm overflows without causing the water to pond up in the low-lying areas of the city.

Finance of Town Drainage.—By 1890, when there were 37 miles of main or brick sewers and 147 miles of pipe sewers, the total expenditure incurred on the underground drainage system was estimated roughly at 110 lakhs of rupees.

¹ Letter from Government to Military Board, No. 2429, dated 22nd November 1852. By this letter the Lieutenant-Governor ordered the only remaining 'apron' of those formerly built to check the flow of the Calcutta drainage into the Circular Canal to be removed.

² *Vide* Mr. Buckley's note of 1881 on the Intercepting Sewer, and Mr. Hughes' notes of the 30th June 1896 and 14th August 1897.

SUBURBAN DRAINAGE

In 1889¹ the Added and Fringe Areas, covering 8188 acres, were incorporated in the town of Calcutta, which at that time extended over 3766 acres. The interests of these areas were entrusted to a committee, called the Suburban Improvement Committee, whose duty it was to consider and mature schemes for the general improvement of these suburbs. Their most essential needs were clearly a water supply and a drainage system. We shall find that for purposes of drainage the new areas fell naturally into three blocks :

- (1) The portion west and south of Tolly's Nullah; including the new docks, and draining towards the south and south-west ;
- (2) The area east of Tolly's Nullah, including Ballygunge and Entally, and draining towards the Bidyadhari ; and
- (3) The area lying between the Circular Canal, Circular Road, and the Eastern Bengal State Railway lines, devoid of all drainage except in so far as outlets were provided by the drains of Calcutta.²

Mr. Kimber, the Chief Engineer to the Corporation, lost no time in preparing rough schemes for a suburban water supply and drainage system.

Mr. Baldwin Latham consulted.—It so happened that Mr. Baldwin Latham, the eminent Sanitary Engineer, was engaged at Bombay in the cold weather of 1890-91, and on the invitation of the Corporation he visited Calcutta in February 1891, and spent nearly a month in examining into the sanitary requirements of Calcutta, including the added and fringe areas. His report, submitted on the 3rd March 1891, dealt with the physical characteristics of Calcutta and the effect of sewage on the Bidyadhari, the defects in the town draining system in respect of the alignment levels and hydraulic gradients of sewers, the tide-locked outfalls, and the insufficiency

¹ Under Act II. of 1888.

² Area (3) is dealt with separately, *vide* pp. 129 *et seq.*

of power in the Palmer's Bridge plant. He proposed to remedy these defects by sectional flushing, an increase of power at Palmer's Bridge, and by improving the outfall.

For the areas newly incorporated in the town he recommended that 'the separate system' of drainage should be adopted, gave the bases for designing the sewers, suggested the alignment and levels for the sewers, and fixed the position for a pumping-station. His report was accompanied by a litho-plan and section of his scheme, and concluded with a reference to the reclamation and improvement of the Salt Lakes. Mr. Kimber, in a note dated the 31st July 1891, criticised Mr. Latham's report, and submitted a scheme (with an estimate) for the water supply and drainage of the town and the new areas. The estimate amounted to Rs1,70,69,527, of which Rs71,80,000 were required for the general sewerage scheme of the fringe and added areas. It may be observed that in its main features Mr. Kimber's scheme had much in common with Mr. Latham's proposals.

Neither of these reports, however, was adopted in the works which were subsequently undertaken, and their interest lies chiefly in their clear statement of the defects of the existing system.

Mr. Hughes' Report.—In 1894 the Government of Bengal placed the services of Mr. Hughes at the disposal of the Corporation. His report contained elaborate proposals for the improvement of the suburban areas, and gives much useful information for the preparation of such schemes; his tide observations in the Salt Lakes, his rainfall statistics and his discussion of the general principles which must govern the sanitation of an Eastern city with a poor population, being of special value. With the exception, however, of his Temporary Drainage Project for Wards 23 to 25 and Bhowanipore, which was subsequently carried out, his report does not form the basis of the Town Outfall and Suburban Drainage Works as finally executed.

Mr. Baldwin Latham was asked to report on Mr. Hughes' scheme and subjected it to some vigorous criticism. In particular he condemned the liberal

provision for rainfall in the sewers and surface drains, and showed that as a rule only about one-third or less of a fall of rain 'flows off,' and that the surface drains should provide for a fall of $\frac{1}{8}$ inch per hour rather than for $\frac{3}{4}$ inch per hour. The sewers were in his opinion twice as large as they should be.

The Joint Report.—As a result of Mr. Latham's criticism a revised project was submitted in 1896 by Messrs. Hughes and Kimber, in what is known as the 'Joint Report,' which, however, differed materially from Mr. Latham's proposals.

The Report is of importance, for although the works as executed departed largely in some respects from its recommendations,¹ it forms nevertheless the basis on which the new Town and Suburban Outfall Works were designed, and also generally of the alignment of part of the Suburban Sewerage system. The provisional sanction of Government for the works proposed in the 'Joint Report' was obtained,² and work was commenced in 1896 under three separate contracts, viz., (a) Outfall Works, (b) sewerage of part of Wards 19, 20, 21, and 22, Ballygunge Pumping-Station and Tolly's Nullah Syphon, and (c) the sewerage of parts of Wards 23, 24, and 25.

The Deviations Imbroglio.—In 1899 it was brought to the notice of the Corporation that very material deviations had been made from the projects as formally sanctioned, more particularly in connection with contract (b) above. Thus, sanction had been obtained for one main line of sewer with five pumping plants, the main sewer running along Russa Road to a pumping-station near Tolly's Nullah; in the execution of the work three pumping-stations were omitted, a new sewer (Main Sewer No. 2) was substituted to drain the Bhowanipore area, and the general alignment of the sewers was considerably modified. Mr. Hughes had described the alterations which he proposed in his note dated 23rd February 1897, but it is doubtful³ whether these proposals

¹ Chiefly in regard to the suburban sewerage of Wards 19, 20, and 21.

² *Vide* Government's letter, No. 147 M, dated 11th January 1897.

³ *Vide* Proceedings of Corporation meeting, 2nd March 1899.

were brought to the notice of the Corporation and the Local Government when sanction was sought for the acceptance of the tender.

Thus in 1899 an awkward position arose. The Corporation was incurring large expenditure on works which had not been regularly sanctioned under the provisions of Act III. of 1899, and it was said that the Commissioners were liable to be sued by any ratepayer for the recovery of moneys paid to the contractors. It was finally decided to take legal opinion. Counsel (the Advocate-General and Mr. Griffith Evans) advised that the commencement of the work without regular sanction was contrary to the statute, and that the Local Government should be asked to approve the work and contracts and to pass a fresh Act to legalise the payments already made. Work was stopped, and Government promised its assistance in the settlement of the difficulty.¹ The Honourable Mr. Buckley, Chief Engineer to the Government of Bengal, delivered awards on the 10th May 1901 and 21st February 1902, as arbitrator between the Corporation and the contractors.

Sub-Committee appointed to Advise.—The question of suburban drainage now required fresh consideration, and the General Committee to the Corporation on 11th May 1900 appointed Messrs. Silk, Wynne, and Rai Khetter Nath Chatterjee Bahadar as an advisory committee. Their report, submitted on 17th July 1900, was adopted, and it was decided that a detailed scheme, with plans and estimates, should be prepared on the lines of this report, and referred to Mr. Baldwin Latham for opinion.

Meanwhile it had become necessary to appoint a special engineer to supervise the execution of the drainage scheme, and on the advice of Mr. Latham the Corporation appointed Mr. J. Ball Hill, A.M.I.C.E., as Executive Engineer of Suburban Drainage. It would be out of place in this work to attempt an appreciation of the valuable services of this officer, who joined his post in December 1899 and is still in the service of the Corporation, but the

¹ *Vide* Corporation letter, No. 206, of 10th April 1900; Government letter, No. 1800 M, of 13th April 1900, and 559 TM of 26th May 1900.

preceding pages will have shown the need for a continuity of policy and supervision in the important works on which the Municipality had embarked. The irregularities already referred to did not constitute the only difficulty. The divided authorship of the existing scheme and the changes in the personnel of the supervising staff were no doubt responsible for the fact that there was no proper plan showing the drainage areas of the suburban sewers then under construction on the basis of their capacity, and that the branch sewers were being built in a somewhat haphazard manner, without proper reference to their place in the main system.

A fresh plan to rectify these omissions was prepared by Mr. Ball Hill, which formed the basis of Mr. Deverell's report of the 24th November 1900 and of the sub-committee's deliberations. The scheme thus modified was now sent to Mr. Latham for opinion and advice. In his report, dated the 5th September 1901, he criticised the scheme and made certain recommendations.

Second Advisory Sub-Committee.—On the 4th October 1901 the General Committee reconstituted its advisory committee to consider Mr. Latham's report, in consultation with the Chief Engineer.

The resolutions of this sub-committee have an important bearing on the works. Mr. Latham's views as to the capacity of the sewers were accepted, the invert of Main Sewer No. 2 already constructed was remodelled, and Main Sewers Nos. 2, 2a, 4, and 5, with their unconstructed branches, were designed to take one part sewage and two parts rainfall.

The work already done at Ballygunge Pumping-Station was abandoned, and this station as well as that at Mominpur was constructed on an entirely new design. These and other modifications in the works were dealt with in what are known as the *Chief Engineer's Second and Third Reports*.¹

The works having been formally sanctioned were

¹ Second Report was dated 31st December 1901, sanctioned by Corporation and Government at beginning of 1902; Third Report was dated 1st July 1902, and sanctioned in Government letter, No. 2877 M, dated 9th November 1902.

carried out under fourteen different contracts, which are briefly described in the list at the end of the chapter.¹

General Account of the Present System.—In view of the extraordinary diversity of expert views as to the best method of completing the drainage system of Calcutta and the prolonged controversy to which the subject gave rise, it has seemed proper to deal at some length with the history of the project which was finally adopted; it is now necessary to give a brief description of the most important features of the completed scheme.

The extension of the Calcutta drainage scheme, which began with Mr. Kimber's rough project of 1890, is generally known as the *Suburban Drainage Scheme*, but the title is not precise, embracing as it does works which deal not only with the sewage of the suburbs but also with the sewage and storm-water of the town proper. The scheme in fact may be more properly described as comprising two projects.

TOWN DRAINAGE

As regards the town—the area bounded on the south and east by Lower Circular Road and on the west by the Hughli—provision has been made for a more efficient outfall for the sewage and storm-water.

1. In the first place, the pumping power at Palmer's Bridge has been increased, as the old pumps were unable to cope with the maximum sewage flow of 3660 cub. ft. per minute to say nothing of the flush-water. The result was that the sewage had to flood the sewers and discharge direct to the old storm-water channel, which formed a storage reservoir practically within the city, until the pumps could deal with it later in the day. The old pumps were accordingly dismantled and replaced by five horizontal centrifugal steam pumps of 100 I.H.P., each capable of raising 2100 cub. ft. per minute 15 ft. high into the new high-level sewer. This installation can deal not only with the future maximum sewage flow, estimated at 5650 cub.

¹ *Vide*, p. 144.

ft. per minute, but also with a portion of the flush-water, or in the alternative with a part of the storm-water.

2. Secondly, a new high-level sewer 8 feet in diameter, built in hydraulic lime concrete lined with a half brick ring in cement mortar, and capable of discharging 11,300 cub. ft. per minute has been built at Palmer's Bridge, running south-eastwards to the spot known as 'Point A,' where it is joined by the *Suburban* high-level sewer about a mile east of the Rifle Range.

It replaces Clark's old high-level sewer, which ran nearly due east into the old central channel in the Salt Lakes, and ultimately found an exit into the Khanaberia Khal, 5 miles from the pumping-station. Inverted syphons have been constructed under the new high-level sewer for the passage of the surface water of the surface drains, numbered 4 to 10. From 'Point A' the combined sewage of town and suburbs flows along a V-shaped open channel, built of masonry in hydraulic line with invert made of brickwork in cement. This channel discharges into the *Suburban Storm - Water Reservoir*¹ about 2 miles east of the Rifle Range, thence to the Byntolla Khal and the Bidyadhari River through the suburban sluice-gates $2\frac{1}{2}$ miles farther east, or $6\frac{1}{2}$ miles from the Ochterlony Monument on the Calcutta Maidan.

3. Lastly, a Head-cut and *Town Storm-Water Reservoir*, with a capacity of 52 million cubic feet, has been excavated between Palmer's Bridge and the Khanaberia Khal 5 miles away.

The city outfall sewer and intercepting sewer converging at Palmer's Bridge are said to have been capable of discharging 470 and 380 cub. ft. per second respectively, or 850 cub. ft. per second, as long as the water in the storm-water outfall channel remained below 12·50 above K.D.S., but this channel soon filled after fairly heavy rainfalls, and the water-level has been known to remain as long as 29 hours above this level, obstructing the outfall. It was found by the tide diagrams that the tides at the Khanaberia Khal or Bidyadhari River remained above

¹ Described hereafter.

the level of 11·50—the highest level compatible with the full bore discharge at Byntolla of the outfall sewers—for about $8\frac{1}{4}$ hours, and would allow during the ebb a period of $4\frac{1}{4}$ hours for discharge. The capacity of the Head-cut and reservoir is equivalent to $\frac{1}{3}$ inch of rainfall per hour, for 8 hours, over the 5292 acres of the city and canal areas. The Head-cut can discharge 1760 cub. ft. per second; the reservoir is 17,000 feet long by 682 feet wide, with a storage depth of 4 ft. 6 in.

In order to discharge this 52 millions cub. ft. in $4\frac{1}{4}$ hours, 8 Stoney's roller sluice-gates have been erected with 14 to 15 feet wide waterways, which are together capable of discharging 5160 cub. ft. per second; 3 gates replaced the old Makalpotta gates while 5 were erected at Byntolla.

The reservoir may be said to be designed with the object of preventing the sewers from becoming tide-locked, thus enabling them to discharge at their full capacity. The new works described above were brought into operation early in 1906, and some relief in the serious floodings, which occurred in the low-lying areas around Sukhea Street after heavy rainfalls, was obtained.

SUBURBAN AREA

The portion of the Suburban area covered by the scheme is roughly bounded on the east and south by the E.B.S. Railway and Boat Canal, on the west by the Circular Road and Kidderpore Docks, on the north by Lower Circular Road and by Beliaghata (which is provided for under a separate scheme).

The ground levels vary between 25·00 above K.D.S. at Kidderpore to 18·00 at the Rifle Range 5 miles away. The subsoil consists for the most part of layers of sandy clay, interleaved with strata of running sand, which has compelled the contractors frequently to use piled foundations for short lengths of both masonry and pipe sewers.

Scope of the Works.—The works include a complete sewerage system, with branches, extending from the Docks on the west to Ballygunge, where the sewage is

pumped into the new suburban high-level sewer ; it thence finds an exit by the combined sewage channel through the suburban storm-water reservoir and the suburban sluice-gates into the Bidyadhari River. The outfall works include a pumping-station at Ballygunge, the suburban high-level sewer, the combined sewage channel, the suburban Head-cut, the suburban storm-water reservoir, and the sluice-gates. In order to lift the sewage from the low-lying areas on the western extremity of the system in the neighbourhood of the Docks, the Mominpur Pumping-Station was constructed, and it was further found necessary to cross Tolly's Nullah by a syphon.

The suburban system includes Main Sewers Nos. 1, 2, 4, and 5, and provides for the sewerage of about 3922 acres on what may be termed a partially combined system.

Description of Sewers.—No. 1 Main Sewer serves an area of 2616 acres, estimated to have a future population of 125,800 persons. It starts with a diameter of 24 inches at a point near Kidderpore Docks, with its invert level at 12·55 Kidderpore Dock Sill. Its diameter gradually increases to 42 inches, as it gravitates to an invert level of 2·65 at Mominpur Pumping-Station, where its full discharge is 2000 cub. ft. per minute. Its contents are raised through 13 feet to a high-level sewer 48 inches in diameter, by two horizontal centrifugal and two direct-acting steam-pumps with a total 54 P.H.P. From this station the sewer—with invert level of 15·27—gravitates under Judge's Court Road to Tolly's Nullah, where it has a diameter of 60 inches. It is then syphoned under the Nullah by a device described hereafter. It emerges on the east side of the Nullah with a diameter of 66 inches, and gravitates through Hazra Road and Ballygunge to Ballygunge Pumping-Station, just east of the Rifle Range. It here has a diameter of 90 inches and is 2·08 below the level of Kidderpore Dock Sill, its discharging capacity being 8900 cub. ft. per minute. It is at this point 7 feet below the level of the city outfall sewer.

Main Sewer No. 2 starts at Tolly's Nullah near Alipore Bridge, with an invert level of 13·11 and a diameter of 15 inches, which gradually increases to 66 inches, as it

gravitates via Kansaripara and Store Road to Ballygunge Pumping-Station (2·08 below K.D.S.). This sewer on its way collects the contents of the subsidiary mains, Nos. 2A, 4, and 5,¹ which drain the Beniapukker and Tiljola areas.

Main Sewer No. 2 drains 1406 acres, estimated to have a future population of 126,500 persons; the maximum sewage discharge for which it has been designed is 1265 cub. ft. per minute, to flow with a velocity of $2\frac{1}{4}$ feet per second, in addition to which it will take twice this quantity of rainfall, thus having a total discharge of 3805 cub. ft. per minute, with a velocity of over $2\frac{1}{2}$ feet per second. The length of masonry sewers in the suburban area is 19 miles; they vary between 90 and 24 inches in diameter, and have been built in brick-work in hydraulic lime or of hydraulic lime-concrete lined with a ring of brick-work in cement.

There are $21\frac{1}{2}$ miles of stoneware pipe sewers, varying from 6 to 18 inches in diameter.

At the summits of the branch sewers automatic flushing stations fitted with Miller's syphons, of a capacity of five minutes' flush, have been fixed. These flushing stations² can be regulated to flush automatically once, or any number of times a day. The velocities of the branch sewers vary from $2\frac{1}{2}$ to 3 feet per second. Junctions are placed opposite each building and opposite vacant land at distances of 40 feet apart, for gully and house connections.

Ballygunge Pumping-Station has four Tangyes coupled compound surface condensing centrifugal pumping-engines, each of 100 I.H.P., and each capable of raising 1750 cub. feet per minute through a lift of 18 feet to the High-Level Sewer, or, 3200 cub. ft. per minute through a lift of 10 ft. 6 in. to the Suburban Storm-Water Channel in times of rainfall. The High-Level Sewer is 5 feet in diameter and is capable of discharging 5780 cub. ft. per minute to point A, where, as before mentioned, it joins the Town sewage and flows through the sewage channel to

¹ 2A is 12 to 24 inches diameter; No. 4 is 15 to 36 inches diameter; No. 5 is 12 to 24 inches diameter.

² There are 134 flushing chambers.

the Suburban reservoir. The storm-water delivered by the sewers is pumped into the Head-cut at this station, where also a storm overflow has been arranged between the sewers and Head-cut for emergency.

The sewage discharged into the Suburban Storm-Water Reservoir is prevented from coming up the Head-cut to Ballygunge Pumping-Station by reflux gates, which have been erected at the junction of the Head-cut and reservoir.

The Suburban Head-cut and Reservoir were excavated between the Ballygunge Rifle Range and the Khanaberia Khāl, at Byntolla¹; they have a storage capacity of 13,132,800 cub. ft., with a high-water level of 12·50 above K.D.S.; the Head-cut is 10,000 feet long by 40 feet bed width, and the Reservoir 14,000 feet long by 209 feet broad, with a depth of 4 to 5 feet of water. Three Stoney's roller sluice-gates command the outlet, each with 15 feet waterway, and a capacity for discharging the Reservoir in four hours, at the rate of 1368 cub. ft. per second.

Tolly's Nullah Syphon.—Calcutta owes its Nullah—a doubtful boon—to the enterprise of Major William Tolley, by whom it was constructed in 1780.

It divides the South Suburban Area into two divisions.² The sewers of the two systems (the western and the eastern) approach and leave the banks of the canal just north of the Kalighat Bridge, with invert levels of 7 and 6·2 feet respectively above Kidderpore Dock Sill, whereas the bed of the canal is 2 feet above this datum. The canal is tidal, carrying a considerable boat traffic, and the *syphon* was designed to link up the two systems by carrying the sewage and storm-water under the canal bed, so as not to interfere with traffic. The first attempt to construct the syphon (1898-99) ended in failure. The work consisted of 2 masonry chambers, one on either bank, connected by two wrought-iron tubes, 15 and 30

¹ They were designed to store storm-water from the suburban area during the period (taken, as in the case of the Town Reservoir, to be 8 hours) in which the Bidyadhari tides stood at Byntolla above the convenient level for the free discharge of the suburban sewers.

² The construction of sewers in the system west of the Nullāh is still in progress. On the 1st April 1914 about 18,777 feet of sewers had been completed out of a contract length of 31,050 feet.

inches in diameter, resting on piling. Messrs. Burn and Company obtained the contract with a tender of Rs79,106. The chambers were sunk and dams thrown across the nullah for the purpose of forming the trench to receive the piling and tubes.

As these dams isolated the Boat Canal, from which the Kidderpore Docks received their water, the dams were cut by the order of the Port Commissioners and the work abandoned. The work formed part of the drainage scheme which had been commenced without the sanction of Government being obtained ; the contract was therefore cancelled, the contractors being indemnified by the payment of Rs51,930 for the materials supplied and the work already executed.

Second Attempt at Syphon.—A new estimate of Rs32,426, in addition to the Rs51,930 already expended, was prepared. The project, based on Mr. Baldwin Latham's report of 1901, was for the lining and completion of the chambers, and connecting them with two lines of 30-inch tubes laid in a trench through the bed of the nullah, with their ends built into the chambers, which acted as sills.

Messrs. Burn and Company were the only firm to tender for the work, and their tender of Rs79,106 was finally accepted in September 1902.

The contractors commenced work soon after and attempted to construct a sort of coffer dam extending about half-way across the nullah, but finding this to be unsuitable, and owing also to the scouring caused thereby to the bed and to the east bank of the nullah, which the contractors had not taken the precaution to protect, they dismantled this coffer dam before it was completed. The contractors then dredged a trench across the canal, and, after floating the syphon tubes into position, lowered them into this trench. They succeeded in connecting the tubes to the west chamber but failed to connect with that on the east side, where the scouring had taken place. The failure was considered to be due to the fact that the contractors did not make a seal between a plate under the tubes provided for the purpose and the sheet piling of the new coffer dam ; the silt from the river-bed

flowed in through the aperture as quickly as it could be excavated until one of the tubes was undermined and subsided.

The period of the contract was extended by three months, but the contractors ultimately admitted their inability to complete the work. Arbitration took place, and the contractors were awarded a sum of about Rs34,000.

More than one design was considered, and on the 18th April 1906 a project estimated to cost Rs78,000 was sanctioned by the Corporation, but on submission for sanction the Government requested an alternative design for an overhead syphon.

Meanwhile, in June 1906, the Government asked that the western approach sewer should be re-aligned so as not to pass through the Jail compound, and offered to contribute Rs1,20,000 to the cost of the scheme if this was done.

Alternative schemes for under and overhead syphons were then considered, but the cost of the latter was deemed prohibitive, and on the 22nd May 1907 the Corporation sanctioned an estimate of Rs2,16,700 for a syphon under Tolly's Nullah including the approach sewers, and this was approved by Government on the 6th of July 1907. The work was advertised, but only one tender, an informal one, was received, and several firms were invited to quote for the work. On the 6th of December 1907 Messrs. Jessop and Company submitted a quotation of Rs2,24,805 for the syphon alone, not including the approach sewers, in which the form of syphon tube was after consultation with the Engineers of the Corporation modified from a circular to a rectangular shape, and after some discussion as to the mode of payment, the contractors consented to accept half the risk. This offer was accepted, and a contract embodying the terms agreed upon was sanctioned by the Corporation on the 21st September, and by the Government on the 26th September 1908.

Syphon as Finally Constructed.—The syphon is a rectangular tube 140 feet long horizontally, 2 ft. 4½ in. wide by 6 ft. 3¾ in. deep in its internal dimensions, constructed of ½ in. steel plates riveted together and stiffened by

angle irons. It is divided into two parts by a $\frac{3}{8}$ in. steel plate running throughout its length which forms it into two rectangular tubes, the smaller being 2 ft. $4\frac{1}{2}$ in. by 1 ft. 3 in. internal dimensions, and the larger being 5 ft. by 2 ft. $4\frac{1}{2}$ in. The rivets in the smaller section are all counter-sunk to lessen friction, the rest are snap-headed, and the iron work inside and out is coated with bitumastic solution to prevent corrosion. The ends of the tube terminate in the two masonry chambers 12 feet diameter and 151 ft. 8 in. apart centre to centre, the chambers being built in the banks of the nullah on a nest of 10 to 12 feet nullah piling, encased in sheet 4 ft. by 12 in. piling driven 22 feet below their foundations.

This compound tube is so constructed as to form a box girder, strong enough to remain rigidly suspended between supports in either bank of the nullah. These supports are each formed by steel girder framing resting on eight 6 in. iron screw piles screwed 28 feet into the sub-soil, which is of pure sand. To prevent any turning movement, as well as to offer protection from the weight of any craft resting over it, close 8 in. dia. bulla-piling has been provided from one support to the other, driven 10 to 12 feet into the bed of the nullah close to and on either side of the tube and cut off 3 inches above it. The space between the piling and tube is packed with building rubbish.

The approach sewer on the west side is 5 feet in diameter with an invert level of 7.00, and that on the east side is 5 feet 6 inches in diameter with an invert level of 6.20 above Kidderpore Dock Sill; these sewers have a total discharge of 5000 cub. feet per minute, while the quantity of sewage or dry weather flow is estimated at 805 cub. feet per minute. The syphon has been constructed of the required capacity to convey these quantities with self-cleansing velocities, and moreover with a dip of 14 feet below the gradient line of the invert of the two sewers or to an invert level of minus 7.50 through the bed of the nullah. It will not only have to convey water but suspended matter in the sewage and silt, and to prevent deposit the design provided for a flow sufficiently rapid to scour all silt through the up-shafts on the east side.

The dry weather flow, as may be seen above, is a small quantity compared with that of the wet season when the sewer will run full bore, and the tube has therefore been constructed in two sections, the larger for storm-water and the smaller for sewage or dry weather flow only.

The inlet sewer is provided with a catch-pit, and is connected to the west chamber and the outlet sewer to the east chamber. The chambers are circular and are each divided with a weir wall running across their diameter at right angles to the line of the tube, and are provided with penstocks and valves so arranged that the dry weather flow can be directed through the smaller tube of the syphon, which has been constructed of such a size that this dry weather discharge will pass through it with a velocity of between 5 and 6 feet per second. When the sewer discharges full bore the increased quantity will overflow the weir wall and pass through the larger section of the syphon tube, at a sufficient rate to prevent deposit.

In order that the tube may be flushed at any time during the dry season a penstock has been provided in the inlet sewer to control its discharge, which after temporary suspension, or until the sewer is full, may be allowed to rush rapidly through the syphon. The valves in the chambers can be so manipulated as to direct the dry weather flow through the larger tube so that access may be had to the smaller for inspection or *vice versa*. Either tube, however, must be pumped out before it can be entered.

The work which was started on the 28th October 1908 was completed on the 31st October 1909 at a cost of Rs2,24,805. The syphon tube was laid and fixed on the 4th June 1909, and the syphon was formally opened by Mrs. C. F. Payne on the 16th July 1910.

Finance of Suburban Drainage.—The capital account of suburban drainage was first exhibited in the Administration Report of 1906-07. Up-to-date totals have been appended to the Reports for following years, and the total cost up to the 31st March 1915, as given in the Administration Report for 1914-15, amounts to Rs69,76,770.

BELIAGHATA DRAINAGE PROJECT

This project forms a part of the main system, but was executed as a separate scheme. It deals with the area bounded on the north and west by the E.B.S. Railway, on the south by the Municipal Railway and Beliaghata Canal, and on the east by the Circular Canal.

Plans prepared by Mr. Hughes in 1899 formed a part of Mr. Deverel's scheme of 1902; the cost was estimated at Rs1,22,769. The project was based on the partially 'separate system'; the sewage and first washings of the streets were to be taken by underground sewers to the silt-pits at Palmer's Bridge Pumping-Station, while the storm-water was to be carried off by masonry open surface drains, partly to the Intercepting Sewer, and partly to the Circular Canal. The scheme, though sanctioned by the Corporation in 1902, did not obtain the approval of Government, which took exception to the great depth of the surface drains and requested that the scheme might be revised.

Mr. Ball Hill's Scheme.—The Executive Engineer, Mr. Ball Hill, however, prepared a new scheme on the 'combined system,' by which the sewage was to be conveyed with a maximum average flow of 1.15 cub. ft. per minute per acre to the pumping-station at Palmer's Bridge, the storm-water, which was taken as equivalent to 0.40 in. of rainfall per hour, being drained into the Intercepting Sewer and the Town Head-cut.¹ His estimate, which was influenced by the increase in the rates of material and labour, amounted to Rs1,37,200, and the whole question was referred in March 1904 to a Special Committee.

The Committee, after carefully considering the old and the new projects, recommended that Mr. Ball Hill's scheme should be adopted; their recommendation was accepted by the Corporation, and the sanction of Government was obtained in May 1904. The work was com-

¹ Through automatic storm-water overflows in Beliaghata Road (discharging into the Intercepting Sewer) and in South Sealdah Road (discharging into the Head-cut).

menced on the 17th January 1906, and completed on the 25th July 1907 at an actual cost of Rs86,261.

As the result of this scheme it became possible to fill up the numerous filthy 'Kutchha' drains of this area and to kerb and channel the roads.

CANAL AREA DRAINAGE SCHEME

The suburb which lies north of Sealdah Station, between the Circular Road and the Circular Canal, is known as the Canal Area.

Forming originally a part of the Suburban Municipality it was amalgamated with the Town under the Municipal Act of 1888. It was utterly devoid of any proper drainage. When the Lieutenant-Governor, Sir Ashley Eden, called upon the Corporation to put a stop to the discharge of the Town storm-water into the Circular Canal—which was then tidal—he pointed out the expediency of so designing the Intercepting Sewer, which runs along the Canal bank, that it might subsequently serve the Canal Area, when its drainage was taken in hand. As a matter of fact, the levels and the method of construction of the Intercepting Sewer do not permit it to be made a part of the Canal Drainage project, and an independent drainage system was found to be necessary for the Canal Area.

Mr. Hughes prepared a rough scheme in August 1897. He proposed a main storm-water drain running northwards from Palmer's Bridge through this area, with a pumping-station at Manicktollah Road. He believed it was impracticable to obtain self-cleansing velocity for the dry weather sewage flow on a 'combined system' of sewers, and therefore proposed a 'separate system' scheme at a cost of Rs26,91,333.

Mr. Ball Hill's Scheme.—In 1905 the Executive Engineer prepared a new project, estimated to cost Rs29,48,000, which was finally sanctioned in 1907, after a Committee appointed by Government had declined to recommend that the storm-water of the Canal Area and the Amherst Street Area should be discharged into the Circular Canal.

The new scheme provided for branch sewers, and such adjuncts as manholes and flushing chambers fitted with Miller's automatic syphons, combined pail depots, latrines, and bathing-platforms, and a main sewer running through the centre of the area from Cornwallis Street and Pal's Lane in the north to its outlet at Palmer's Bridge Pumping-Station.

This sewer is syphoned under the Town Storm-Water sewers at Manicktollah and Khairu Munshi Road. The scheme provides for a discharge equivalent to $\frac{1}{4}$ inch of rainfall per hour over the area served, and the sewers are arranged to flow with a self-cleansing velocity of 2 to $2\frac{1}{2}$ feet per second when delivering the maximum average dry weather flow, and 3 to $3\frac{1}{2}$ feet per second when flowing full. It provides also for the drainage of a considerable area of the city in the neighbourhood of Amherst Street and Sukea Street, the main sewers in Machua Bazaar and Sukea Street, which formerly discharged into the Circular Road sewer, having been cut off from that sewer, syphoned under it and extended to the new Canal Area Main Sewer, which provides them with a better outflow. The Sukea Street sewer has moreover, to meet extreme emergencies, been extended to the new Manicktollah Pumping-Station, whereby it will for the first time in its history afford a full free flow to the storm-water of the low lying areas, which it helps to drain.

• *Roads.*—11,596 feet of roads, 60 feet in width, and 13,970 feet of *new* roads, 40 feet in width (apart from the widening of some existing lanes), were constructed after the acquisition of the necessary lands. The project (the cost of which was subsequently increased to Rs44,51,709) in fact developed into a drainage and town-planning scheme combined; and is a work in which the Corporation may feel a just pride.

Pumping-Station.—The execution of the scheme presented several problems, of which two possess a special interest.

A defect in the Land Acquisition proceedings made it advisable to settle by compromise the claim of the owners of Nandan Bagan tank, through which the main

sewer passes. By the terms of the agreement the Corporation was obliged for the owner's benefit to fill up this tank, which it would have acquired at small cost, with over 2 million cub. feet of earth brought by rail from the Salt Lakes, the Municipal Railway being extended for the purpose to the site of the tank.

Secondly, the difficulties, which were encountered and finally overcome in the construction of the Manicktollah Pumping-Station, testify both to the treacherous character of the Calcutta soil and to the skill and perseverance of the engineers. It was originally intended to construct the station on the new road linking up Sukea Street with the new 60 ft. road, but the sub-soil proved so difficult that the present site was chosen.

Great difficulty was experienced in constructing the sump and silt pit chambers of the station; the foundations had to be laid on brick wells, built on steel kerbs sunk to 10 or 12·50 feet below datum. The completion of the low-level 4 ft. 4 in. by 6 ft. 6 in. main sewer also presented a difficult problem. This sewer had been laid up to 60 feet of the intake chamber before 1912, and the work was resumed in March 1913, after the foundations of the pumping-station had been completed. The concrete bed was being laid on firm solid clay and little remained to be done, when suddenly on the 30th March a water and sand spring burst through the clay bed, increasing so rapidly in size and volume, that—before the concreting could be rushed through by the aid of pumps—a slight subsidence occurred in the pumping-station foundations, which cracked across the centre from north to south. The work was at length resumed with the aid of divers, who formed a masonry box of concrete on the trench bed prepared partly by open excavation and partly by removing the sand under water with pulsometer pumps, the water in the trench being allowed to rise to the level of the sub-soil water, as a precaution against further subsidence of the foundations. Good progress was being made when another sand spring burst through the clay. The remaining portion of the sewer was completed by laying it on masonry wells, sunk on steel kerbs.

But in the meantime it was found necessary to reconstruct a portion of the sewer already laid with such difficulty; the obstruction of the cement masonry made it impracticable to sink masonry wells, and the costly expedient of interlocked sheet steel piling had to be adopted. The Canal Area drainage works were completed in 1914-15, and inaugurated by His Excellency the Governor of Bengal. The lengths of the main and the branch sewers are about 3 and 11 miles respectively, and the total cost of the project was Rs44½ lakhs. The new scheme has already effected an appreciable improvement, in the health of the neighbourhood, and there has been a remarkable drop in the mortality returns for this area.

Chetla Rice Mill Drainage.—Recently attention has been called to the nuisance caused by the Chetla rice mills south of the Boat Canal. There is at present no sewerage system to dispose of the offensive liquid of the scalding vats, and a project for sewerage this Chetla area and pumping the drainage northward across the Canal to the sewers in Chetla Road has recently been prepared, the estimate amounting to some Rs80,000.

Silting up of the Bidyadhari.—Some consternation was caused in the Corporation by a report in 1913, in which Mr. Lees, an engineer in the Public Works Department, elaborated the view that the Bidyadhari, which forms the outlet for the drainage of Calcutta, was rapidly silting up, and that its life for drainage purposes was unlikely to be more than another 6 years.

The Corporation had a series of cross sections taken of the river above and some miles below Byntolla, and it seems evident that the river is silting up at least more slowly than was at first thought. In view, however, of the possible future deterioration of the river and the project for the construction of a Grand Trunk Canal between the Hughli and the Kult, together with the canalisation of the Bidyadhari, the Government of Bengal appointed a Committee, on which the Corporation is represented, to consider the question of diverting the sewage and storm-water of the city from the Bidyadhari to some other outfall. Rough estimates for three alternative projects

for the discharge of the sewage and storm-water, without treatment, to either the Kulti River, the Salt Lakes, or the Hughli, have been laid before the Committee.¹

Pumping of Sewage.—In 1875 nearly 15 million gallons of sewage were pumped daily with an annual consumption of nearly 1400 tons of coal; in 1891 about 24 million gallons were pumped daily, about 1796 tons of coal being used in the year; in 1900 the daily average pumped was about 17 million gallons, with an annual consumption of about 1500 tons of coal; in 1914-15 about 24,000 million gallons were pumped in the year (a daily average of about 67 millions), over 6000 tons of coal being consumed during the year.

FLUSHING OF SEWERS

In order to ventilate the sewers and keep them in efficient working order adequate flushing arrangements are necessary, the essential element of which is the sudden and powerful discharge of a large volume of water into the sewers. This object is attained by the provision of *flushing chambers* or *manholes with flushing discs*, adapted to secure the discharge of a volume of water proportionate to the size and gradient of the sewers.

The main sewers are flushed by water admitted from the river at high-tide, while unfiltered water taken from ground hydrants is utilised for cleansing the branch and small sewers.

The arrangements devised by Mr. Clark in 1869 for flushing pipe sewers were unsatisfactory in the absence of any large quantity of waste water passing through the sewers, and in 1882 the Special Conservancy Committee stated that ‘no flushing arrangements, properly so called, exist for any third class sewer,’ but they looked forward to the extension of the unfiltered water supply and hesitated to recommend any large expenditure ‘on adventitious contrivances for flushing the sewers.’

¹ In 1914-15 a scheme was proposed for scouring out and maintaining a deep-water channel in the river as long as possible. An increased *spill area* will be obtained by acquiring a portion of the Salt Lakes to the north-east of Diappa Lock.

Mr. Thomas Jones' Sewer Enquiry.—In 1883 Mr. Jones, whose agitation of the sewer question has already been referred to, pressed in his Memorandum for the introduction of automatic flushing tanks as an auxiliary aid to the cleansing of the sewers.

In 1885-86 flushing wells were constructed at or near the summits of pipe sewers, and some light, portable hand-pumps with hose were purchased; about the same time large flushing chambers were constructed in Mukhtaram Babu's Street and at Hastings, where also the portable pump was replaced by a permanent fixed engine.

With the general introduction of the unfiltered water supply, all manholes became flushing chambers.

Modern Provision for Flushing.—In the suburban drainage scheme ample provision for flushing was made by the use of *Miller's Automatic Syphons*, and the matter has received considerable attention in recent years.

In the Added and Fringe Areas several flushing chambers were constructed; near Bhowanipore Pumping-Station a chamber was constructed with a capacity of 30,000 gallons, to flush the main receiving sewer in Circular Road.¹

In the town area also flushing chambers were introduced on a large scale, while throughout Calcutta the minor sewers have gradually been provided at their summits with apparatus which operates automatically, and when the system is completed the flushes from the tributary sewers will help to flush the main sewers until the whole system becomes self-cleansing.

Penstocks.—Six penstocks or sluices have been provided for flushing the main sewers, four (a)² being placed by the Hughli and two (b)³ by Tolly's Nullah. The penstock gates are opened for flushing purposes one hour before high tide and closed an hour after the ebb begins, care being taken that the height of the water within the penstock does not exceed 18 feet.

¹ This flushing chamber has, however, recently been demolished.

² (a) No. 1 at Sobhabazaar Street; No. 2 at Nimtola Ghât Street; No. 3 at Jackson Ghât; No. 4 at Chandpal Ghât.

³ (b) No. 1 in the Government Telegraph depot; No. 2 at Katuakhati Road.

LIST OF CONTRACTS (*vide* page 127)

Contract 2 (Martin and Co.) was allowed to be proceeded with and included Town Suburban Reservoir and Head-Cuts, Makalpotta, Byntolla and Suburban Sluice-Gates, Town High-Level Sewer, Roads and Syphons under, and Chamber Point A, part of the Combined Sewage Channel, Bridges for the Reservoirs and Head-Cuts, Superintendents' Quarters at Byntolla, and small petty works, such as Culverts, etc. The works were commenced January 1897.

• Contract 3 (Messrs. Burn and Co.) included the sewers constructed before 1900, in the area East of Tolly's Nullah as well as Tolly's Nullah Syphon and Ballygunge Pumping-Station, which were only partially executed and had been abandoned. No further works were executed under the Contract after April 1900. Commenced February 1898 and completed April 1900.

Contract 4 (Messrs. Martin and Co.) included the sewers in the area West of Tolly's Nullah. Commenced January 1897 and completed 1899.

Contract 5 (Messrs. Martin and Co.) was for the extension of the engine-house at Palmer's Bridge. Commenced December 1901 and completed in 1903.

The Superintendent's Quarters at Palmer's Bridge were constructed under separate contract by Babu Biman Behari Sircar.

Contract 6 (Messrs. Burn and Co.) was for the completion of Main Sewer No. 1, East of Tolly's Nullah. Commenced November 1902.

Contract 7 (Messrs. Burn and Co.) Tolly's Nullah Syphon. Commenced November 1902; works subsequently abandoned.

Contract 8 (James Simpson and Co.) machinery for Budge-Budge (or Mominpur) Pumping-Station.

Contract 9 (The Bengal Stone Co.) buildings of Budge-Budge Pumping-Station. Commenced June 1903.

Contract 10 (Messrs. Martin and Co.) for the completion of the Main Sewers 2, 2a, 4 and 5, and Branches. Commenced March 1903.

Contract 11 (Babu Lungut Singh) Suburban High-Level Sewer.

Contract 12 (Babu Lungut Singh) Ballygunge Pumping-Station. Commenced June 1904.

Contract 13 (Messrs. Jessop and Co.) machinery for Ballygunge Pumping-Station. Commenced January 1904.

Contract 14 (Babu Lungut Singh) Reflux gates in the Suburban Head-Cut, and completion of the Combined Sewage Channel.

Contract 15 (Messrs. Martin and Co.) Sewer crossing the E.B.S. Railway.

CHAPTER IV

CONSERVANCY OF CALCUTTA

IN tracing the progress made in the sanitation of Calcutta during the nineteenth century we have seen that the Fever Hospital Committee emerged from their elaborate inquiry into the conditions and the needs of municipal Calcutta, with the firmly-grasped principle, that any adequate scheme of improvement must be based upon a comprehensive drainage system. No compromise or makeshift in their view deserved serious consideration, although there must have been some temptation to advocate a less costly and therefore less final solution for which the Government of their day might have been prepared to pay. For many years financial difficulties seemed to render their labours abortive, but the elaborate scheme, which Clark began and which our engineers of the present day are perfecting, is ample vindication of the wisdom and prescience of Sir J. P. Grant and his colleagues. This development of the drainage system of Calcutta has been described, and in the heading of the present chapter we limit the term 'conservancy' mainly to the following heads :—

- (1) Surface cleansing of the streets, and the removal and disposal of domestic and trade refuse.
- (2) The removal of night-soil.
- (3) The provision of public necessities.
- (4) The drainage of private premises.
- (5) Miscellaneous (public conveniences, house drainage), etc.

Early Efforts in Conservancy (1793-1856).—It has already been shown that the municipal authorities of the earliest days were mainly occupied with the cleansing

of the streets. The statute of 1793 authorised the Justices to appoint scavengers and to make assessments for this purpose. The Improvement Committee (1809) and the Lottery Committee (1817) subsequently executed many considerable works of public utility, but the Conservancy Department, administered by the Chief Magistrate in practical independence of the Justices, was responsible for the sanitation of Calcutta. The organisation of the department is described in considerable detail in the report and appendices, compiled by the Fever Hospital Committee.

In 1835 we find Mr. McFarlan, Chief Magistrate, expressing satisfaction at the state of the roads of the town; he had 'heard it admitted by good judges that the main roads are better and pleasanter to drive over than in most towns of Europe.'

The regularity moreover with which the sweepings of stables and houses were removed compared favourably in his opinion with the arrangements in 'some European towns.' It must be admitted that energetic steps had been taken since 1820 in the direction of metalling streets and improving the surface drains and the removal of refuse, but the evidence of Lieutenant Abercrombie in 1836 before the Commission shows conclusively how inadequate the conservancy arrangements still remained. The defects in drainage have already been referred to; his indictment of the system of street-cleansing merits quotation.

'There are at present,' he states, 'no effectual means in use for putting the streets into a proper state of cleanliness, and preserving them in such. Dust and rubbish and all kinds of dirt are thrown into them, *ad libitum*, from every house, to be picked up as may be when the carts of the present very inefficient establishment may happen to come round. The greater number of these carts are common native hackeries of the worst description, which will hardly hold two *gurrahs* of rubbish without its falling off. They are drawn by wretched old bullocks, unfit for employment by the merchants, and are supplied by a contractor. The drivers are also

obtained in the same manner, so that there is no effectual control over them, when they neglect their work or do it lazily. The coolies also are supplied in the same way. . . . The probability is that half of them neglect their work in order to work for private employers, receiving pay both from them and the town.'

He refers to road obstructions, with which his department was powerless to cope. 'At Hautkhola, the road is completely shut up two days in the week by a market held there.'

• 'In one part of the Strand Road, a large grass market is kept.'

He attributed the failure of his department partly to its divided control, the Chief Magistrate's authority being apparently sometimes undermined by his colleagues, who indeed as justices were theoretically empowered to share in the administration, and partly to the weakness of his staff.¹

Improvements in Conservancy (1856-1906).—Before proceeding to describe the present methods of collecting and disposing of the city refuse, it will be convenient to refer briefly to the steps by which the conservancy of Calcutta 'has to sight and sense,' in the words of one of its Health Officers,² 'within living memory undergone a revolution.' The history of the municipal administration in the first half of last century shows no lack of vigour or initiative, but until municipal government was based upon popular representation, it seemed impossible to finance the costly schemes, which the administration saw to be necessary.

In 1836 the only funds strictly belonging to the town were the house tax and the excise duties. For 1836 the house tax amounted to Sa.Rs1,97,200, and the abkari (excise) to Sa.Rs1,46,100, giving a total of Sa.Rs3,43,300. The expenses of cleansing, watching, and repairing the streets, estimated in 1836 at Sa.Rs2,83,866 were under Act of Parliament chargeable against the town fund, but an additional sum of Sa.Rs2,46,128 was expended by

¹ There were 28 carts belonging to the town, 89 hackeries, and 159 loading coolies, for the removal of refuse.

² Dr. K. McLeod.

Government for Police and Law and Justice charges.¹ The disbursements on account of 'Cleansing roads and drains' amounted in 1836 to Sa.Rs73,891.

Between 1840 and 1856 some attempts, as we have seen, were made to introduce a system of local self-government. The house-rate was raised to 6½ per cent. and there was a steady improvement in the municipal finances. The following statement shows the amount of the house tax and the amount expended on 'cleansing roads and drains' for some years prior to the important Act VI. of 1863.

Year.	House Tax.	Cost of 'Cleansing.
1850 . . .	2,74,810	.....
1851 . . .	2,79,419	.....
1852 . . .	3,44,957	.....
1853 . . .	3,52,775	92,771
1854 . . .	3,57,281	93,091
1855 . . .	?	1,11,056
1856 . . .	3,58,716	1,22,665
1857 . . .	4,86,107	1,24,578
1858 . . .	4,99,013	1,25,933
1859 . . .	5,35,683	1,30,202
1860 . . .	5,55,127	1,46,608
1861 . . .	5,83,632	1,44,768
1862 . . .	6,21,366	1,47,672

In 1875, the municipal revenue from all sources, exclusive of the police-rate, which was dealt with as a separate fund, amounted to 25½ lakhs of rupees; conservancy expenditure aggregated nearly 3 lakhs, which in 1877 rose to nearly 3½ lakhs.

In 1913-14 the total revenue amounted to Rs104,49,275; the cost of street cleansing, including Incinerator and Municipal Railway charges, was almost 9 lakhs.

Organisation of Conservancy Branch.—In 1856, when the first elaborate conservancy act was passed, a surveyor on a salary of Rs600 a month, assisted by a staff of inspectors, performed the duties of road engineer, lighting

¹ The budget head was:—'Judicial and conservancy charges'; some items are strictly conservancy charges, just as many police charges were included in the estimate of Sa.Rs2.83.866.

superintendent, drainage engineer, and superintendent of conservancy. For many years the organisation of staff remained a problem of the greatest difficulty. It was a simple matter for the executive to prove at any time with some finality that for the efficient conservancy of the city an increase in staff was essential, but it was also clear that without raising the rates an increase in any branch of the establishment could only be obtained by a re-shuffle of staff, or a re-organisation of departments. During the last quarter of the century, the panacea for defective conservancy was constantly sought in the overhauling of the machine, and this policy is reflected in frequent changes of organisation. In 1878 the night-soil and nuisance departments were taken from the Health Officer's charge and handed over to the Engineer; in 1882 they were again transferred to the Health Officer.

In 1887 the conservancy, nuisance, and health departments were amalgamated, and in 1894 a committee was appointed to consider the old question of again placing the conservancy and nuisance departments under the Engineer! The Commission appointed in 1884, under section 28 of Act IV. of 1876, pointed out with much truth that 'the great defect in present municipal arrangements in Calcutta is not so much the want of establishment as the absence of organisation and defective supervision,' but it is also clear that the defective supervision was mainly due to the want of a sufficient superior staff.

Public opinion in Calcutta was now becoming articulate, and conditions that would have been suffered with resignation in earlier times began to arouse a dissatisfaction which it was impossible to ignore. In 1882 and in 1883 special committees were appointed to inquire into and report upon the sanitation of the town; but the practical results were meagre. In March and April of 1884 a cholera epidemic of unusual severity, along with the publicity given to the charge of municipal neglect, which Dr. Payne, late Health Officer to the Corporation and then Surgeon-General of Bengal, had launched against the Commissioners brought matters to a head.

Commission of 1884.—In June 1884 a memorial was

presented to the Lieutenant-Governor urging the appointment of a commission under section 28 of Act IV. of 1876.

The Lieutenant-Governor was of opinion that a thorough investigation into the complaints made by the memorialists was desirable, and on the 14th August 1884 appointed a Commission, consisting of Mr. Beverley, Census Officer in 1876, Dr. Lidderdale and Mr. H. J. S. Cotton.

Their report is a document of great importance. The excellent work of the Commissioners, appointed under the Act of 1876, is recognised, but the grave defects of the city conservancy are plainly indicated. In the absence of any specific finding that the conservancy of the town had been neglected, the Corporation held that they were under no statutory obligation to carry out the recommendations of the Commission, but actually a great many of the proposals were adopted as funds became available.

It is interesting to find that the Commission advocated the appointment of a whole-time Health Officer, who might in addition to his more technical duties be expected to supervise all surface conservancy. In 1886-87 the Bustee conservancy establishment, which had been proposed by Dr. Payne in 1877, but not sanctioned until 1883, was made a part of the Health Department.

Conservancy under Health Officer.—In 1887 the Conservancy, Nuisance, and Health Departments were amalgamated under the Health Officer, an increase of Rs25,000 per annum being allotted for the additional staff, which the re-organisation made necessary.¹ In 1890 the Health Officer submitted proposals for the better conservancy of the area added to the town by Act II. of 1888, and the arrangements of these areas were brought into line with those of the town, the Sanitary and Scavenging establishments being merged into one, with a Superintendent and an Assistant Superintendent of Conservancy for the whole of these areas, and an Inspector for each ward.

In 1894 complaints regarding defective conservancy

¹ Corporation resolution, 27.6.87.

again became rife, and on the 16th July the Corporation appointed a committee to consider the propriety of again amalgamating the Conservancy with the Road Department. The scheme was, however, strongly opposed by Dr. Simpson, the Health Officer, and the inquiry dragged on until in 1896 the alarm raised by the outbreak of plague in Bombay led Government to appoint a Medical Board to consider what action should be taken by executive authorities in Bengal. On the 16th October 1896 the services of Dr. Banks, a Civil Medical Officer under the Government of Bengal, were lent to the Corporation. He was given a large extra establishment, and appointed Superintendent-in-Chief of the Conservancy and Nuisance Branch of the Health Department. A record of his labours on a somewhat ungrateful task is contained in his vigorous and outspoken reports.

The inadequacy of the Conservancy arrangements of Calcutta formed at this time (26th November 1896) the theme of the Lieutenant-Governor Sir Alexander Mackenzie's historic speech at Entally, and whatever view is taken of the justice of his remarks on the working of the municipal constitution of that time, it is clear that a very thorough overhauling of the conservancy system was essential. We have seen that the controversy which his action raised at last culminated in Act III. of 1899.

In 1898 the recommendations of a conservancy committee led to (1) the purchase of additional carts and cattle ; (2) the increase in the pay of coolies, who were to supply an afternoon as well as a morning service ; (3) the appointment of sircars, in place of peons, to supervise the coolies in each block ; (4) an increased equipment for the clearing of gully-pits.

In 1899-1900 an attempt to introduce an afternoon cart service ¹ failed owing to a lack of plant, but in 1900-1 extra gangs of coolies were engaged for the most filthy localities, and in 1901-2 a staff for removing horse-droppings by day from the streets was for the second time entertained.² In 1905-6 the exhaustive inquiry of Mr.

¹ Already recommended by the committee of 1883-84.

² The experiment had probably been tried in 1883-84.

Payne, Deputy Chairman, not only resulted in the standardising of the conservancy establishment, but led to other improvements in the general system. On his advice a supervisor was placed in charge of conservancy in each district, the separate bustee blocks first introduced by the Health Officer in 1877 were abolished, special checks were introduced to ensure each cart making its allotted number of trips, and the duties of the supervising and menial staff were carefully prescribed. His proposals, exclusive of the capital expenditure required for carts, cattle, etc., involved an annual increase of Rs38,000 in the establishment and maintenance bills.

COLLECTION AND DISPOSAL OF REFUSE

The surface conservancy of a large city implies generally three operations : (a) the collection of refuse, and (b) its removal in bulk to (c) the site where it is finally disposed of. Corresponding to these three steps, there are in Calcutta three distinct and independent institutions, namely, the Gowkhana, the Municipal Railway, and the Square Mile.

1. GOWKHANA

The Gowkhana (lit. cattle-shed) is one of the earliest institutions of the Municipality. It may be briefly described as a depot for storing the refuse carts and stabling the municipal cattle. The Report of the Fever Hospital Committee refers to a Northern Gowkhana, situated in Boitakhana Road on the site of what is now known as Gowkhana II., and to a Southern Gowkhana, which stood in Police Hospital Road, Entally. At a still earlier date the Municipality had been entirely dependent on contractors for their supply of coolies, cattle, and carts, but Lieutenant Abercrombie's policy of increasing the number of municipal-owned carts by a standard type commended itself to the authorities, and the Gowkhana became an institution of ever-growing importance.

As Calcutta expanded, the necessity of a strong and well-equipped gowkhana became increasingly apparent. In early times it had been easy to find convenient dumping-grounds for the town refuse : the ditch to the east of the fort, where the bodies of the victims of the Black Hole had been thrown, provided until it was filled up in 1766, ' a receptacle of all the filth and garbage of Calcutta.' ¹ In later times the Mahratta Ditch was the city rubbish-heap, while the road sirkars and overseers appear also to have profited by diverting the sweepings to tanks or depressions on private lands.

The Strand Bank had its formation in the same process. As the volume of refuse increased and the limits of the town were extended, the scavenger was sent further afield. Some part of the refuse was thrown into the river, but in general the sweepings from the northern part of the town were dumped at Soora and other places outside the town precincts, while the refuse from the southern quarter was removed to Ballygunge. In their report for 1859 the Commissioners complain that ' these localities are already beyond convenient distances from the town, especially during the rains, when, owing to the nature of the ground, carts sink right up to the axle-tree in the mud.'

They proposed to construct ' a sort of tramway ' on light, movable rails, ' on the other side of the Circular Road canal ' to receive the refuse collected in conservancy carts, and convey it to a dumping-ground outside the town. We learn from the Report of the following year that the plan was impracticable, but the idea proved fruitful, and in 1867 a refuse railway of a more ambitious type was constructed.

In 1824 a ' complement,' or, as we should now term it, the standard strength of carts, coolies, etc., deemed requisite for conservancy purposes had been fixed by Mr. Shakespear, Chief Magistrate. In 1835 Lieutenant Abercrombie, in an able note, proposing (amongst other conservancy reforms) to ' substitute a fixed and responsible establishment for the scavenging of the town '

¹ Roy, p. 69.

in place of the old system of contract labour and plant, worked out a new standard, which in the main appears to have been adopted. At that time the town possessed 115 carts, 29 bullocks, and 36 horses; 75 bullocks and 117 hackeries complete were supplied daily by a contractor.

The Superintendent proposed to abolish the contract system, and asked for sanction to a standard of 170 carts, 80 horses, and 90 bullocks. The average number of loading coolies, drain coolies, mehtars, etc., daily provided by the contractor was over 800, for which a permanent staff of about 500 menials was to be substituted.

The new system appears to have worked satisfactorily; but, as we have seen, the expansion of Calcutta each year rendered the collection and disposal of refuse a more difficult matter. In 1857 the Southern Gowkhana, already improved in 1835, was still further enlarged, and with it was incorporated the first municipal workshops, where carts were constructed and repaired, signboards painted, house-numbers cut out, and lamps and lamp-posts repaired. In 1901-2 the division of Calcutta for administrative purposes into four districts led to the construction of two additional gowkhanas, one in Grey Street and one in Alipore, where its completion in 1906-7 enabled the authorities to discontinue the extravagant and inefficient contract system which had been maintained in the added area since the amalgamation of the suburbs with the town in 1888.

Growth of Gowkhana Plant—The Report for 1854 speaks of 'many Brahmanic Bulls' being sent to the authorities for a nominal fee and turned to good account. The supply of cattle was maintained by the despatch of overseers or peons to the mogusoil, with authority to acquire these dedicated bulls from the villagers or to purchase oxen and ponies from the fairs at Raneegunge, Ulaberia, and Midnapore. In 1856, the gowkhana cattle numbered 555 animals; in 1859 there were 534 oxen and a considerable number of ponies; in 1858, 51 ponies were added, while the number of oxen fell to 478. In this year, the number of municipal carts had been in-

creased to 404. In 1859, there were 490 oxen, 75 ponies and 407 carts ; in 1860 the live stock consisted of 408 oxen and 130 ponies. In 1862, we find a strength of 306 oxen and 217 ponies. Prices had risen considerably. The Municipality, which had once been able to purchase 'Brahmanic Bulls' at under Rs4 per head, was compelled in 1859 to purchase oxen in the open market at Rs12 per head, and the average price soon rose to Rs20 ; the price of ponies, which were first systematically used in 1858, rose from Rs16 in that year, and Rs12 in 1858 to an average of Rs60 in 1862. The heavy strain imposed upon the cattle in drawing refuse to distant dumping-grounds over roads, which became almost impassable during the rains, caused excessive wastage, and prior to the construction of the refuse railway, the maintenance of sufficient strengths at the gowkhanas was the constant preoccupation of the authorities. After 1867 the strain upon these establishments became less exacting, but they still remain a most important factor in the system of conservancy, and even to-day slackness in gowkhana administration is invariably reflected in inefficient conservancy. Each gowkhana is managed by a superintendent on a salary of Rs200-250. He is provided with free quarters on the premises, and under the District Engineer is directly responsible for the proper administration of the gowkhana, and the supervision of his carters. In practice, he is mainly concerned with stable management, involving the maintenance in proper condition of cattle, carts and harness.

In 1861, a serious epidemic of farcy led the Commissioners to appoint a veterinary surgeon on a monthly fee of Rs50, plus Rs25 for medicines, to watch over the health of the municipal cattle, and for many years this practice of engaging a consulting surgeon was continued. It is now customary to appoint as superintendents only experienced men with a good practical knowledge of stable management and simple veterinary science. At the present time, the Corporation is fortunate in having one superintendent,¹ who has not only had a

¹ Mr. S. Joseph of Gowkhana III.

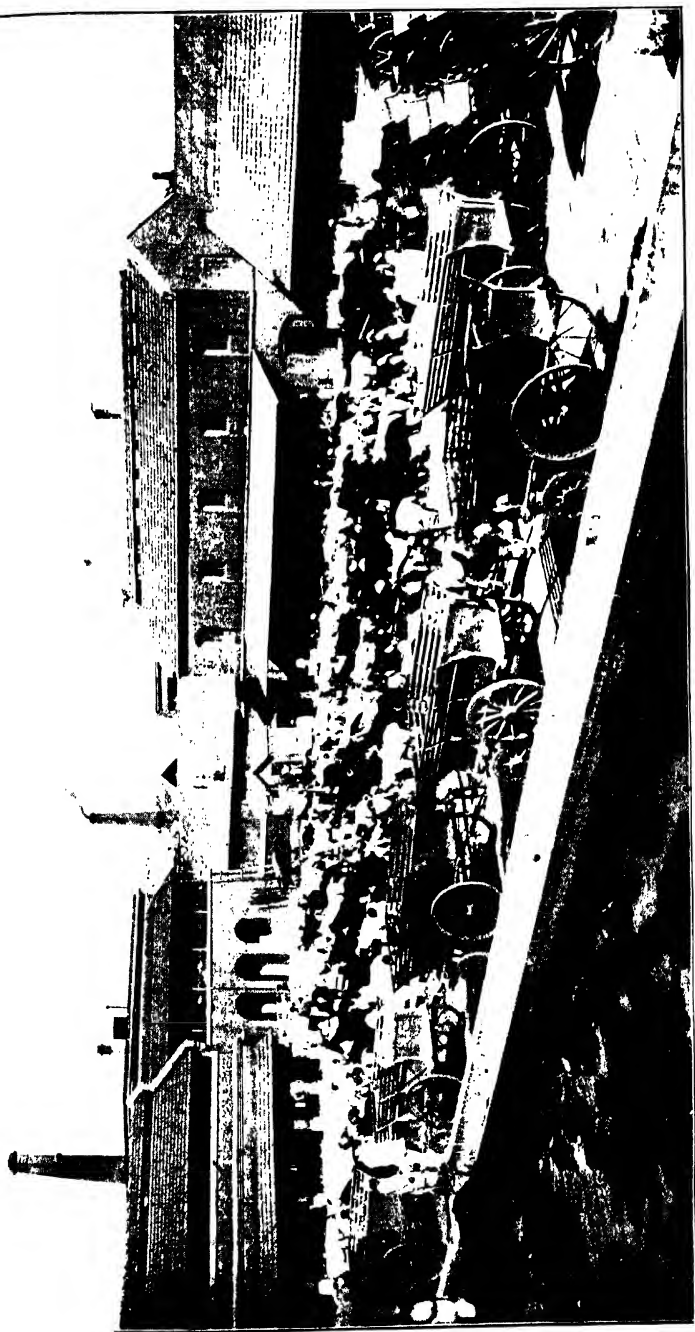


Photo by Bourne & Shepherd Calcutta

MUNICIPAL GOWKHANA. DISTRICT I

wide experience in veterinary treatment, but possesses a rare skill in the operation for converting raw up-country stallions into manageable cart-ponies. The Corporation procures these ponies, which are of a sturdy useful type, from distant up-country fairs at an average price of Rs120 to 130 per head, landed in Calcutta. Stray or dedicated bulls are purchased at the rate of Rs25 per head and buffaloes at Rs30 per head.

The 'Complement' or Standard Strength.—In 1906-7 Mr. C. F. Payne, then Deputy Chairman, made a most complete and exhaustive inquiry to ascertain the strength in carts and cattle requisite for the efficient conservancy of Calcutta.

His proposals were accepted *in toto* by the Corporation, and the standard strength was fixed as follows :—

	Carts.	Carters.	Ponies.	Bulls.	Buffaloes.
District I. .	484	454	317	54	110
Do. II. .	310	319	217	78	63
Do. III. .	333	323	202	82	89
Do. IV. .	506	449	204	222	78

The scale of ration allowed to each pony, bull, or buffalo was fixed in 1901-2.

The standard strength and the scales of ration are with slight modifications still in force. Petty repairs to the carts are still executed at the gowkhanas, while the well-equipped municipal workshops, situated in Entally, are responsible for constructing new carts and executing extensive repairs.

Up till 1867 the pivot on which the city conservancy turned was the gowkhana. With the construction of

2. THE MUNICIPAL RAILWAY

in 1867, the functions of the gowkhana were curtailed, and it became practicable to insist on better organisation and consequently greater efficiency in the collection of the refuse. The painful steps by which this reform was reached will be described hereafter; at this stage, it

will be convenient to give a brief account of the refuse railway which made the advance possible. We have seen that with the expansion of Calcutta, the localities selected for the final deposit of its refuse were constantly pushed further out from the heart of the town. The strain on the conservancy cattle was thus continually augmented, and the possibility of a breakdown of the system was always imminent. It was early seen that the solution of the problem lay in the application of mechanical traction for the removal of the refuse in bulk. The railway was divided into two main sections, the one running from Theatre Road to Bagh Bazaar Street along Circular Road, to facilitate the transfer of refuse from the carts to the trucks, and the other running eastwards along the line of the main outfall and high-level sewers to convey the refuse to the Square Mile, the dumping-ground situated in the Salt Lakes.

Two branches linked up the line with the River and the Canal for the transport of road metal. Cranes were originally used for lifting the refuse from carts into the wagons but proved unsatisfactory, and in 1868 the platform system, which is still in use, was introduced. Six large loading platforms, approached by ramps, were constructed at convenient points in Circular Road; the refuse is drawn in the carts up the ramp and then discharged into the trucks. The railway was originally 8 miles in length and cost 5½ lakhs; in 1877 its length was increased to 12 miles, and in 1910-11 another 3 miles of line were constructed. A Traffic Superintendent, who is responsible for the regulation of traffic and for the punctual supply and removal of wagons, was appointed. He is under the immediate control of the engineer of district, and is assisted by a Permanent Way Inspector. The locomotives and wagons are repaired in the municipal workshops.

The Sanitary Commission of 1884 drew attention to the inadequate platform accommodation, and the want of sufficient rolling-stock and engine-power. A special committee in 1887 examined into the working of the railway, and on its recommendation a large increase in the

rolling-stock was sanctioned. In 1906-7 the site of one of the platforms was absorbed in the extension of the Campbell Hospital, and the opportunity was taken to close the two southern platforms, and construct a new platform with adequate accommodation near Karya, a little east of Circular Road. The refuse carts which served these three platforms had seriously obstructed the traffic of Lower Circular Road ; it now became possible to marshal them in the Karya yard, whereby both the traffic and hygienic conditions of an important thoroughfare were improved. The project was completed in 1908-9 at a cost of Rs160,000. To the municipal railway, in conjunction with the drainage scheme, Calcutta chiefly owes its release from the conditions which in 1864 made it, according to Sir John Strachey, 'a scandal and a disgrace to a civilised Government' and 'literally unfit for the habitation of civilised men.'

In these more exacting times, it is the ardent desire of every public-spirited citizen of Calcutta to rid Circular Road¹ of an unsightly and unhygienic system. Even in 1870 we find Dr. D. B. Smith, Sanitary Commissioner for Bengal, describing the new arrangements as 'a great sanitary abuse,' and 'an ill-considered and reckless system of conservancy,' creating 'foci of corruption,' which in his opinion were fraught with serious danger to the health of the town. The Lieutenant-Governor, however, after personally inspecting the railway, was of opinion that Dr. Smith's somewhat sensational report exaggerated the inherent hygienic defects of the system, and there can be little doubt that the railway, if efficiently worked, can be criticised with more justice from the æsthetic standpoint than on sanitary grounds. The possibility of removing the railway from Lower Circular Road has recently been carefully examined ; the substitution of motor traction appeared the most feasible of several alternatives, and the purchase of two motor lorries has already been sanctioned. If the experiment succeeds, it is hoped in time to replace all the refuse carts by motor lorries, which would unload at or near Palmer's

¹ In 1867, this road was still the eastern boundary of Calcutta.

Bridge, thereby enabling the refuse railway to be removed altogether from Circular Road. The railway removes on an average over 1000 tons of refuse daily from the Circular Road platforms to the dumping-ground at the Square Mile. The carrying capacity of a wagon may be placed at 10 tons, so that roughly 36,000 wagon-loads of refuse are removed each year to the Square Mile. The following figures, extracted from the report of the 1884 Commission, will give an idea of the steady increase in the quantity of refuse removed since the early years of the railway.

Year.	Number of wagon-loads removed each year. ¹
1877	7,343
1878	7,284
1879	7,981
1880	9,155
1881	11,197
1882-83	16,948
(fifteen months)	
1883-84	13,433
1884-85	7,529
(six months)	
1913-14	36,000-

The account of the removal of refuse may now be completed by a description of the Salt Lakes, with particular reference to

3. THE SQUARE MILE

where the refuse is finally deposited. There are probably many European residents of Calcutta who have never heard of the Salt Lakes, and yet if one of the early sanitarians of the city were to rise from his grave and to be interviewed on the health of Calcutta he would almost

¹ It must also be remembered that for many years the street-sweepings were largely used for filling tanks in the town, until the practice was condemned as insanitary in 1889.

certainly preface his remarks by inquiries about this marshy swamp.

The Lake or Lakes are an extensive marsh or fen about 3 miles east of Calcutta, covering an area of some $18\frac{1}{2}$ square miles, and forming the northern fringe of the Sundarbans. The Lake is in reality a large shallow basin communicating by a main narrow outlet with the sea ; it receives the drainage of a large extent of country to its west, and through its outlet receives water from or discharges it into the Bay of Bengal, the ebb and flow depending on the tide. Captain Hamilton, one of the old 'interloping' traders, writing in 1710, attributed the insalubrity of Calcutta in part to the 'thick, stinking vapours' of putrefying fish left stranded in the Lakes on the dissipation of the annual floods. The deadly effects of the noxious exhalations or miasma arising from the Lake gave rise to much scientific speculation and to frequent demands for its drainage. Dr. Martin states in a note (1839) on the Lake that he believed 'from Captain Hamilton's notice of it, as well as from tradition . . . that in former times it was far deeper and more extended than we now find it, and indeed that it came up quite close to the eastern boundary of Calcutta.' Dr. D. Stewart states that forty years before he wrote (1836) it apparently extended to Dum-Dum. In course of time by silting and accretion, assisted more recently by artificial processes, this marshy region has shown a tendency to fill up. In 1837 Captain Prinsepp wrote an elaborate note to demonstrate the practicability of draining the Lakes, with the double object of improving the health of Calcutta and of recovering a large area of land for cultivation.

It required courage for the Fever Hospital Committee to maintain that in their opinion the insalubrity of Calcutta was to be attributed rather to the want of proper internal drainage than to the proximity of the Salt Lakes. In 1865 we find Major J. P. Brougham, Presidency Surgeon, advancing an enthusiastic plea for the drainage and reclamation of this fen, and as recently as 1884 a similar scheme was seriously considered. But

experience has perhaps now sufficiently demonstrated that the health of Calcutta is not prejudicially affected by the vicinity of the Lakes.

The place of the Lakes in the drainage scheme is indicated in Chapter III.: we may here describe their utilisation in the disposal of refuse.

Prior to 1865 the town sweepings, apart from that portion which was utilised for filling up tanks and in the formation of Strand Bank, were removed in carts to outlying localities at Soora, Ballygunge, etc., set apart for the purpose. An attempt to burn the refuse in kilns proved a failure, and in 1865 the idea of a refuse railway was approved. In that year a portion of the Salt Lakes—a *square mile* in area—was acquired by Government for the Justices, to be used for the drainage outfall works, for sewage cultivation, and as a *dumping-ground for the town refuse*. The acquisition was completed in 1866 at a cost of Rs93,225.

Embankments were constructed and the tidal waters excluded. In 1868 the refuse began to be removed to this area by the Municipal Railway. An open sewage channel was subsequently excavated in continuation of the high-level sewer; substantial embankments protected it on either side. This area, closed in on all sides by embankments and intersected by the sewage channel, came to be known as the 'Square Mile.'

The refuse is conveyed in trucks to the 'Square Mile,' and there unloaded by a contractor,¹ who is paid at the rate of Rs1.3.0 per wagon.

In 1879 this contractor, Babu Bhubonath Sen, obtained a lease of the Square Mile (excluding the skinning ground described hereafter), together with all water-courses (subject to existing rights) and all fishery rights in any channels, tanks, etc., *which might be made by him*. His enjoyment of these rights was disturbed at different times by the construction of the storm-water channel and of other works in connection with the drainage

¹ This contractor is also the lessee of the fisheries in the Square Mile. An account of the history of the fisheries will be found in an interesting note submitted to a Special Committee on the 3rd January 1908.

scheme, but the lease is still held by his son, Babu Manmatha Nath Sen.

In 1900 a survey of the Square Mile was made, which showed 1660 bighas of land to be in the possession of the lessee, of which about 450 bighas were in full cultivation. It was estimated that the cultivable land was sublet at an average rate of Rs25 per bigha. The annual rental fixed by the lease of 1879 was Rs3400 ; in 1880 the fisheries and fish market existing before 1879 were included in the lease, and the rental increased by Rs1700. In a later lease taking effect from 1900, the rent was fixed at Rs13,263 per annum.

INCINERATORS

It is generally agreed that the most cleanly and sanitary method of disposing of city refuse is an efficient system of incineration. The adoption of this method, however, for the refuse of an eastern town is beset by special difficulties owing to the low calorific value of the materials of which it is composed, which include large quantities of silt from the sewers and much moist vegetable matter. Dr. Simpson, Health Officer (1886-1897), who in 1890-91 was sent on deputation to England to obtain accurate information on the subject of cremators suitable for Indian conditions, was an ardent advocate of incineration in Calcutta, but the means adopted to burn the evil-smelling unconsumed gases from the furnaces were not successful, and even Dr. Simpson finally ceased to recommend incineration in any crowded or important locality. If, however, the refuse has to be first removed to some remote locality before incineration, the present method of dumping it at the Square Mile has the advantage of being more economical and convenient, and cannot now be said to be open to any very serious objection upon sanitary grounds.

Early Experiments.—In 1863 an attempt was made to incinerate refuse in a kiln, built three miles from the heart of the town, on a plan which had worked

successfully at Karachi. The process however was both costly and slow. In 1864 a cremator designed by the Health Officer, Dr. Fabre Tonnerre, was erected at Dhappa to burn the carcasses and offal removed from the streets of Calcutta. The experiment appears to have met with some measure of success ; six to eight cartloads of animal refuse were destroyed daily at a trifling cost, and the cremator was worked for some years. In 1888 Mr. B. R. Harrington, C.E., offered to construct and work three incinerators, which would destroy the entire refuse of the town, for a monthly payment of Rs2000 each.

Under arrangements made in the following year, Mr. Harrington erected an 8-cell incinerator on a site immediately south of the Campbell Hospital in Circular Road, which was acquired at a cost of Rs18,263. This incinerator cost Rs37,000, and it commenced work in May 1890. It was successful in destroying all the refuse put into it, but it proved a failure, as the smoke emitted caused a serious nuisance. Messrs. Bird and Co. also erected a cremator at Gobra, at a cost of Rs13,000,¹ but this likewise proved unsuccessful. The plant was sold in 1892 after experiments for burning night-soil in it had also failed.

The Goragatcha Incinerator.—Undeterred by his previous failure, Mr. Harrington erected a second incinerator in 1892 in Goragatcha which is still at work. This has eight furnaces and cost Rs49,000 ; it was opened in August 1892, and daily destroys 11 truckloads of about 110 tons of refuse, at an estimated cost of 4 annas 4 pice per ton, exclusive of interest charges. In 1913-14 over 41,000 tons of refuse were destroyed, 36 tons of coal were consumed, the total cost of upkeep was Rs11,290, and the amount realised from the sale of clinker was about Rs3000.

The Entally Incinerator.—During the next ten years no further progress was made with refuse incineration, but in May 1902, after a prolonged discussion with the Government, who pressed for the removal of a refuse platform (known as No. 4) from the neighbourhood of

¹ Half the cost was to be borne by the contractors if the cremator failed.

the Campbell Hospital, the Corporation entered into a contract with Messrs. Joseph Baker and Son for the construction of an incinerator which was intended to serve as a substitute for the objectionable platform, and which was erected on the site previously occupied by Mr. Harrington's plant. This was a 9-cell incinerator of the Baker type, guaranteed to be capable of effectually incinerating without nuisance 135 tons of wet refuse during a period of 24 hours of continuous working. The contractors were to construct the incinerator in twelve months, and to superintend the work for eight months after completion, and to be paid a sum of £12,430 in all (£11,560 for installation and £870 for cost of supervision for the eight months' trial). The total cost of this incinerator was Rs280,908,¹ and the annual charges amounted to Rs20,000; it was taken over by the Corporation on the 16th November 1905. This incinerator was open to the objection that it consumed a large quantity of coal, and that the cells could not be separately cleaned, and it was closed in October 1908, as upon the conclusion of a new agreement for the Square Mile, under which the refuse wagons are unloaded free of charge, it ceased to be economical to work it. The cost of incineration was estimated at 7as. 6p. per ton, and the yield of clinker amounted to 12½ tons daily, this material being utilised for manufacturing artificial stone and also as a foundation for pavements.

DUST-BINS AND DEPOSIT OF REFUSE IN STREETS

As the agencies for disposing of refuse became more satisfactory, the expediency of regulating the throwing of refuse from private premises into public streets assumed importance. From the earliest times the

¹ Cost of incinerator	Rs173,400
• Remuneration for supervision (£870)	13,050
Ramps, etc.	93,319
Minor works	1,139
Total	Rs280,908

administration had complained of the apathy and indifference of the public and the absolute lack of their co-operation with the conservancy staff. Even in 1884 Sir Henry Harrison could write that it was 'useless and unfair to expect that everything can be done by the Commissioners without the aid or co-operation of the people. As long as the habits of the people are filthy, parts of the town will be filthy. Do the Corporation what they may, and make what rules or bye-laws they may choose,

*Quid leges sine moribus
Vanæ proficiunt ?*

Early in the last century it became clear to the municipal authorities that the practice of casting refuse into the streets at all hours of day must stultify the efforts of any conservancy staff, and in 1837 Lieut. Abercrombie suggested that refuse carters should be provided with bells, on hearing which the inhabitants should 'bring out' their refuse to deposit in the carts. It has required more than fifty years to bring about the change in the habits and standpoint of the people, without which such an ordinance must have remained a *lex vana*.

Act XIV. of 1856 authorised the Commissioners to prohibit the deposit of refuse in the streets except at certain hours, but at the same time required them to provide convenient places for the deposit of refuse.¹

Act IV. of 1876, sections 194-96, reaffirmed the Commissioners' right of prohibition, but left it subject to the provision of dust-bins at convenient places.

The Army Sanitary Commission, in reviewing the municipal Report for 1877, recommended the use of dust-bins, but the measure so far as the northern part of the town was concerned had its drawbacks in (1) the cost of a sufficient number of dust-bins and the possibility that their use would merely effect a concentration of the nuisance, (2) the difficulty of finding suitable sites in the crowded quarters of the city, and chiefly (3) in the

¹ *Vide* sections 12 and 15 of Act XIV. of 1856, and sections 119 and 122 of Act VI. of 1863.

disinclination of the Commissioners to countenance so drastic a restriction on the right of the ratepayer to use the public streets as a rubbish-heap at all hours of the day and night. In the southern division these difficulties were not insuperable, and in 1883 fixed hours of depositing refuse (midnight to 7 A.M.) were prescribed.

In 1884 the special Conservancy Committee appointed in 1883 recommended that fixed hours, viz. midnight to 8 A.M. and midday to 2 P.M., should also be introduced for the northern division, and the adoption of this proposal marks a real advance in the conception of civic duty. From 1882 the provision of refuse-bins on private premises was encouraged in the European quarter of the town, although it was not prescribed by law;¹ in the more densely populated Indian quarter, comparatively few premises can furnish the necessary space, and it has frequently proved difficult to find an unobjectionable site for public dust-bins in the narrow streets of northern Calcutta.

At present the deposit of refuse in the public streets is prohibited between the following hours :—

District I.	10 A.M. to 2 P.M.
District II.	
(a) Commercial area	6.30 A.M. to 8.30 P.M.
(b) Non-commercial area	<div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">8 A.M. to 1 P.M.</div> <div style="display: inline-block; vertical-align: middle;">3 P.M. to 7 P.M.</div> </div>
District III.	
(a) European quarter	6.30 A.M. to 8.30 A.M.
(b) Remaining portion	8 A.M. to 8 P.M.
District IV.	
(a) Wards 18, 21-23	8 A.M. to 8 P.M.
(b) Wards 24, 25	7.30 A.M. to 8.30 P.M.

Trade Refuse and Stable Manure.—Section 12 of Act XIV. of 1856 imposed a penalty on any person depositing stable refuse in any other place than that prescribed in such behalf by the Commissioners, and in 1857 we find the authorities arranging for the removal of the refuse of extensive stables at the cost of the owners.

¹ Under Act III. of 1899 the Chairman is empowered to direct the occupier of any premises to provide his own dust-bin, but the power has rarely been exercised.

Under Act VI. of 1863 a bye-law was framed requiring the payment of fees for the removal of trade refuse, and prohibiting its deposit on the public streets without the permission of the Justices. Such fees were first imposed in 1867.

The right of the Justices under Act. III. of 1899 to impose fees for the removal of such refuse under section 431 has, however, been sparingly exercised. Trade refuse is now ordinarily removed with other refuse; when however the quantity is considerable, it is customary to require the occupier of the premises concerned to collect and remove such refuse to the railway in Circular Road, or to pay for its removal by municipal carts.

• REMOVAL OF NIGHT-SOIL

The arrangements which obtained in the early days of the Municipality for the disposal of night-soil were extremely primitive.

The larger houses possessed private privies, while the poorer classes who lived in huts, sometimes shared one privy between four or five huts and sometimes resorted to the 'mehtar tatties' or public necessities, which, instead of being municipal property, were built and managed by private enterprise. The night-soil was collected from private privies by mehtars, who were paid fees by the occupiers of the premises, and conveyed to depots, called Tollah Mehtars' depots, placed at convenient centres. It was then removed to the night-soil ghât on the river bank near the Mint, carried down stream in boats hired by the Municipality on the contract system, and thrown into the river. The evidence taken by the Fever Hospital Committee shows that the mehtar tatties were usually a grave nuisance, the excreta being sometimes thrown into any neighbouring tank or pool, or placed in a narrow trench or even 'scattered over the adjoining spot and left to remain there for ever to be dried by the sun.'¹ The night-soil of private privies

¹ Evidence of Babu Srinath Mukerjee of Sobha Bazaar.

was frequently disposed of by the same insanitary methods.

One Babu Bishunath Motilal of Bow Bazaar complained to the committee in language more forcible than polite, that whereas mehtars were formerly not permitted to remove the night-soil except at an advanced hour of the night, 'they now (1837) on the contrary walk through the streets and high roads with baskets of filth full of stink on their heads, at any hour of the day. But when it happens to the lot of a person, who has just made a hearty meal, to fall before any one of these mehtars, it is needless to say how it is felt by him.'

He complains also that the ghât-keepers do not allow the night-soil to be thrown into the river 'unless they could get something by threatening the poor mehtars.'¹ Lieut. Abercrombie complained of 'privies opening out on drains which border streets'; the usual 4-anna fine was no deterrent, and he advocated closing up such openings with masonry and establishing a few municipal latrines with proper cess-pits as an example. The public drains of this time were rarely built of masonry, and had no proper scour or flow; it is possible to imagine the result from the statement of Sir John Strachey in 1864, when he declared that 'the most important streets and thoroughfares of the northern division of Calcutta form to all intents and purposes a series of huge public latrines, the abominable condition of which cannot adequately be described.'

Sir John Strachey's trenchant report on the conservancy of the town was brought to the notice of the Justices by the Lieutenant-Governor, who suggested that it might be practicable to license the mehtars and oblige them to submit to a tariff of charges fixed by the Justices for services rendered to private persons.

The Chairman of the Justices was aware that only a comparatively small portion of the night-soil of the city ever found its way to the ghât, '90 per cent. being thrown into the public drains under cover of night,'

¹ Apparently at this time the Municipality had not provided 'filth-boats,' as they were called.

but he and the Justices also recognised that to throw 200 tons of night-soil daily into the Hughli would prove most injurious to the health of the city, and in 1864 some experiments in dry conservancy, *i.e.* burying the night-soil in trenches, were made at Dhappa. The embankments of the Salt Lakes were, however, levelled by the great cyclone of that year, and the ground becoming inundated and impregnated with saline matter, lost its deodorising property.

Regulation of Mehtars.—Act VI. of 1863 enabled the Justices to place some restrictions on the removal of night-soil; the remuneration of the mehtars, the mode and the hours of removal, the routes to be traversed, and the location of night-soil depots were duly prescribed. Each depot was in charge of a sirdar, who was licensed by the Justices and supplied by them at fixed rates with the requisite number of buckets and carts. His license specified the limits within which he was authorised with his staff of mehtars to ply his business; the occupiers of houses which his men served paid him wages on a scale fixed by the Justices. The whole force was under the surveillance of an Inspector of Nuisances, who instituted prosecutions for infringements of the regulations, but the control of the Municipality does not appear to have been very effective.

In 1866 it was arranged that the Justices should construct suitable depots and lease them to tollah mehtars, and in 1867 we find that the Municipality was realising a profit of about Rs600 per mensem from the few depots it had constructed. In 1870 considerable progress in substituting municipal for private depots was brought about by withholding licenses from many of the latter, and in 1875 we find the Justices taking the further step of registering mehtars, whom they could supply at fixed monthly fees for private work. This system, which depended for its success upon the tactful management and efficient control of the mehtars, gradually gained in popularity, and the experiment pointed to the expediency of strengthening and regularising this control.

Since 1870 the practice of throwing the town night-soil

into the river had been discontinued ; it was henceforth discharged at depots into the main sewers of the new drainage system.

Tollah mehtars were charged certain fees for the privilege of emptying their buckets at these depots, such fees being collected by the headmen amongst the mehtars, and paid over to the Corporation. The defiant attitude of the mehtars, however, prevented the authorities from making any effective check upon the receipts, which, as the following statement shows, were by no means inconsiderable.

Year.	Receipts.
1870	Rs10,210
1871	22,688
1872	25,957
1873	28,830
1874	28,200
1875	29,750
1876	44,540

Act IV. of 1876.—This important Act empowered the Corporation

- (a) To license tollah mehtar depots ;
- (b) To license mehtars ;
- (c) To abolish tollah mehtars and to undertake the duties usually performed by them.

In 1877 the Executive undertook experimentally in one portion of the town the duty of night-soil conservancy with a paid establishment. The tollah mehtars immediately struck in a body all over the town, and attempted to intimidate the municipal sweepers where they refused to join the combination. The strikers sent persons into the mofussil to prevent other mehtars coming to the assistance of the authorities, and circulated a story that all sweepers taking service under the Municipality were to be sent off to the West Indies. No effort and expense were spared to meet the difficulty,

and a mehtar corps, estimated to cost $2\frac{1}{2}$ lakhs, in 1877 was hastily organised.

On the 5th June 1877 a notice was issued by the Commissioners under section 244 of Act IV. of 1876, declaring that the duties performed by tollah mehtars would henceforth be performed by a municipal establishment, a scale of fees being fixed ranging from 8 annas per month for houses valued at Rs50 a year to the maximum of Rs8 a month for houses valued at Rs5000 a year or over.¹

It was expected that the night-soil fees would give a handsome annual surplus over expenditure, but this hope was illusory, and although the new arrangements proved beneficial from a sanitary point of view, their financial effects were serious. The house-rate had to be raised by 2 per cent., and the general revenue was heavily burdened owing to expenditure on night-soil conservancy.

Reconstruction and Connection of Private Privies.—It was found that the defective structure of private privies added greatly to the labours of the new staff, and a systematic campaign was therefore waged against the most unsatisfactory types. In the seven years ending in 1884, we find that nearly 10,000 privies were remodelled, while new privies were required to be built according to a standard plan. As the execution of the drainage works progressed, it became possible to initiate the policy of having private latrines connected with the sewers, but owing to the deficient water supply such connections were shortly after 1876 practically prohibited.

By 1884 only some 2000 private privies had been thus connected; the unconnected privies were over 39,000 in number, and some 1200 mehtars were engaged in attending to them. In 1896 the Health Officer could still complain that little advantage had yet been derived from the sewerage system so far as the 'connection' of private latrines was concerned; there were still over 32,000 'unconnected' privies in the town and over 20,000 in the suburbs, requiring a staff of over 2000 mehtars to clean them.

Section 299 of Act III. of 1899 gave the Chairman

¹ The monthly rates for huts ranged from annas 4 to Rs2.

power to require the owner or occupier of a house to connect his premises with a public sewer, and the completion of the drainage works both in the town and suburbs, as also the extension of the unfiltered water supply, made practicable a more liberal use of this section. Between the years 1888 and 1898 the number of connections was about 1000 ; in the decennial period 1900-10 there were over 10,000 connections. At the end of the year 1913-14 there were 36,644 service privies or pan-closets and 21,785 connected privies or water-closets in Calcutta.

Sewer System.—The night-soil from connected privies passes through the sewers to (1) the drainage pumping-station at Ballygunge, serving the Added Area south of the town, (2) the Manicktollah Pumping-Station recently constructed to serve the Added Area east of the town, and (3) Palmer's Bridge Pumping-Station, which drains the town proper. The sewage is then raised and flows by gravitation to the Salt Lakes. The excreta collected by mehtars from service privies is discharged into the sewers at certain depots, called pail-depots or night-soil depots.

Since the completion of the suburban drainage scheme, the old *trenching grounds* at Ultadinghi, Sura, Pagladonga, Tiljala, Dhakuria, and Goragatcha,¹ which served the Added Area, have been closed.

PUBLIC CONVENIENCES

(a) *Latrines.*—We hear in 1854 for the first time of the provision of public conveniences ; two urinals for public use were constructed by the Commissioners, and the erection of two others was begun ; from the reports for succeeding years, however, it appears that this policy was not continued. There were many so-called public latrines, *i.e.* latrines owned by private persons and open to the public on payment of a monthly fee, ranging from

¹ A trenching ground was also acquired at Bhatchola in 1895-96, and likewise closed on the completion of the drainage scheme.

2 to 4 annas, or a casual fee ranging from a few cowries to 2 pice. It appears that even in 1835 these latrines were licensed by the municipal authorities. Act XII. of 1852¹ gave legal sanction to this custom, and by Act XIV. of 1856 the imposition of license-fees was authorised.

In 1856 the fees were inconsiderable (Rs899), and for some years they did not exceed this amount. In 1866 the Justices constructed four latrines from municipal funds, with results so satisfactory that it was decided to construct twenty additional latrines at a cost of Rs1,20,000. In 1868 seventeen sites were selected with great care and acquired by the Justices. Some of these municipal latrines were farmed out to headmen amongst the mehtars, while some were worked by the Conservancy Department, and we have seen that in 1870 the competition of privately owned latrines was reduced by the simple method of withholding licenses. In 1878 apparently all municipal latrines were exempted from the payment of fees, but in the following year the fees were revived.

In 1884 there were 71 public latrines in the town, of which 36 were the property of the Corporation and 35 privately owned and licensed under the Municipal Act.

In 1885, on the recommendation of the Commission of 1884, all municipal latrines were made free. The *jamadari* or licensed 'public' latrine still persisted for some years, but they were unable to support the unequal competition, and the system has now disappeared. There are now thirty-five public (municipal) latrines in Calcutta, of which several contain separate accommodation for females. In all 'improved' bustees dealt with under chapter xxvi. of Act III. of 1899, the owners of the land have since 1882-83 been required to construct latrines of approved type and accommodation for the use of the bustee tenants. These semi-public latrines, like those owned by the Municipality, are all connected with the public sewers.

(b) *Urinals*.—It has already been stated that public urinals were first constructed in 1854. Ten years later

¹ Section 26 of Act II. of 1848 authorised the Commissioners to make bye-laws for the regulation of 'public' latrines and urinals.

it was decided to erect gradually 100 urinals throughout the town; these were completed by the end of 1878. During the following thirty-three years there has been no rapid increase in the number of public urinals, of which in 1914 there were only 164. The type of urinal now used is known as the Bombay pattern, its cost being about Rs450.

(c) *Bathing Platforms*.—A vigorous campaign against the foul tanks and wells which abounded in Calcutta was carried on by Dr. Payne, an energetic if not always a tactful Health Officer. The corollary of this policy was, obviously the provision of other means of washing and bathing for the poorer people of Calcutta. In 1883-84, on the recommendation of the Bustee Committee, 3 bathing platforms were constructed at a cost of Rs2076. They were at first supplied with unfiltered water, but in spite of this fact they immediately achieved popularity among the poorer classes. In the following year 24 new platforms were erected, and the Commission of 1884 strongly advocated a large increase in the number—more particularly in bustee areas. Any rapid increase was, however, found difficult, owing partly to the small diameter of the unfiltered water distribution-pipes which began to be enlarged in 1884-85, and partly owing to the delays then inseparable from land acquisition proceedings. Since 1896-97 the bathing platforms have been supplied with filtered water, and as separate compartments are provided for males and females, there is nothing to prevent the poorest citizen from enjoying a free bath in cleanly surroundings at any hour of the day. In 'improved' bustees, landlords are required to provide adequate bathing accommodation for their tenants.

At the end of 1914 there were in Calcutta 112 bathing platforms, including those constructed by bustee owners.

The standard type of 'bathing platform' consists of a large raised masonry reservoir, into which water is constantly running, with a platform beside it on which the bathers stand to perform their ablutions. The water is poured over the person, and at once runs off into the

sewers, so that the supply in the reservoir remains uncontaminated.

4. HOUSE DRAINAGE

The underground sewers were designed to carry off (1) rain or storm-water ; (2) liquid drainage from house and open drains ; (3) privy drainage.

The rapid progress of the drainage works drew the attention of the Justices in 1870 to the question of house drainage. The connection of house-drains with the sewers was obviously not the least important part of the drainage scheme. Sections 19 and 20 of Act II. of 1848 provided for linking up private drains at the owners' expense with municipal sewers. Sections 51-53 of Act XIV. of 1856 empowered the Commissioners in certain cases to insist on the construction of drains leading into the public drains or sewers. In the absence, however, of properly constructed street drains, such provisions were futile.

In 1854 we find the Commissioners, with the co-operation of Government and private house owners, undertaking the improvement of the drainage of two small blocks in the vicinity of Government House and Dalhousie Square, but they were warned by Clark that any extension of this procedure must wait upon the execution of a comprehensive drainage system. His scheme was commenced in 1858, and in 1863 we find the Government of Bengal directing that no house drainage should be admitted into the sewers until the outfall works were completed.

In 1870 the Commissioners began seriously to grapple with the question of discharging house drainage direct into the sewers.

The deficiency of the water supply proved, however, for many years a grave obstacle to this policy.

The increase in the total number of buildings connected between the years 1873-85 is shown in the following Table :—

Year.	Aggregate number of connections.
1873	3,201
1874	3,943
1875	4,728
1876	7,231
1877	8,471
1878	9,779
1879	10,619
1880	11,694
1881	13,291
1882-83	16,887
(fifteen months)	
1883-84	19,046
1884-85	20,149

The census of 1881 showed the total number of buildings (pucca and kutcha) in the town as 38,774, so that by 1885 not more than about half the premises in Calcutta had been connected with the sewers. By 1900 the number of connections was 31,295; in 1910-11 it was just on 40,000; and since that year about 1200 new connections have been made annually. In 1911 there were 61,806 occupied houses in the town and suburbs, so that the proportion of occupied premises connected with the sewerage system had considerably increased since 1885.

Supervision of House Drainage.—Municipal supervision of house drainage is in Calcutta a matter of comparatively recent growth. It was not until 1883 that a staff was entertained to supervise even the actual connecting of the private drain with the sewer. The work inside the premises and the connection with the sewer were both carried out by licensed contractors or plumbers. In 1883 two inspectors on Rs45 a month and two on Rs35 a month were appointed to supervise connections, but the Engineer constantly urged the *absolute necessity* of improving the supervision. Inspectors were also maintained with the double duty of examining *existing* water-fittings and house-drainage fittings. Finally a House Drainage Superintendent was appointed; he was at first

entirely subordinate to the Engineer, but the advisability of obtaining the co-operation of the Health Department in this important branch of municipal work was afterwards recognised.

At present proceedings for the improvement of house drainage in old premises are initiated by the Health Department, the plans being considered jointly by the Health and Engineering Departments, while the *execution* of the 'inside' drainage by a plumber is supervised by the latter Department, which maintains a permanent staff for making at a moderate charge the actual connection with the sewer.

In the case also of new buildings and new house-drainage plans, the co-operation of the two departments is carefully provided for. The entertainment of a municipal staff for effecting connections with the sewers has been advantageous both to the Corporation and to the private individual, the fees are fixed and moderate, while the danger of having the sewers damaged by inefficient plumbers is avoided.

The fees realised under the drainage bye-laws amounted in 1913-14 to Rs41,984, while the cost of establishment, etc., for inspecting house drainage and the cost of carrying out connections amounted to Rs41,381.

MISCELLANEOUS

Disposal of Carcasses.—From the evidence taken by the Fever Hospital Committee (1837) we find that a small staff of domes with carts was maintained in each of the town divisions for removing carcasses from the streets to the river. The carcasses were usually exposed in the vicinity of the old Nimtola Burning-Ghât; skins of any value were removed by *chamárs*, and the flesh left for scavenger birds and beasts. The lessee of the ghât was responsible for its cleanliness, but the Commissioners were unable to exercise much pressure upon him, and repeated complaints were lodged against the nuisance caused by carcasses in every stage of decomposition.

In 1856 arrangements were made for the disposal of carcasses farther up the river, at Colabari Ghât. The new ghât was prepared at a cost of Rs3263, of which Rs2500 was the amount paid for the land. It was let merely as a depot for dead animals, which were to be removed by the lessee within a reasonable time for the purpose of being skinned without the precincts of the town. The ghât was closed ¹ after the opening of the Municipal Railway and the acquisition of the Square Mile, and since 1870 all carcasses have been conveyed to a site in the Salt Lakes, where a 'skinning platform' has been constructed. The old practice of taking merely the skins and leaving the residue for vultures, jackals, and dogs obtained for some time, but in 1881 Messrs. Feilmann and Co., who realised that various parts of the carcasses could be converted into commercial products, obtained a lease of the ghât at Rs1010 per month. In 1905 the 'ghât' was leased for ten years, at Rs16,800 per annum, to Messrs. Möll, Schute and Co., who at their own expense set up modern plant for converting all parts of the carcasses into useful products.

¹ The site was sold to the Port Commissioners in 1874.

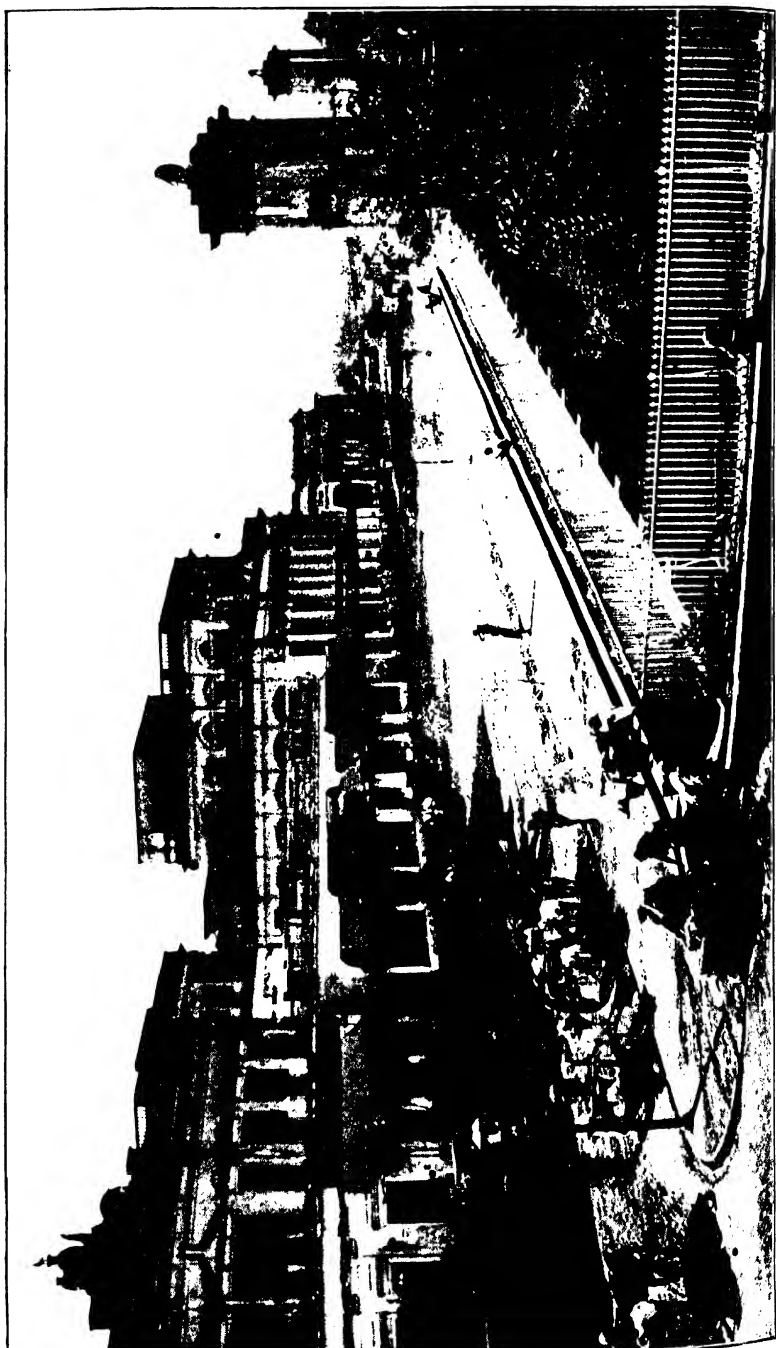
CHAPTER V

WATER SUPPLY

• WE have seen that until comparatively recent times the question of conservancy was the pivot on which all municipal administration turned. It called so urgently for a solution that for a long time other and hardly less important functions of a municipality received scant recognition. The elaborate drainage works, which were commenced in 1859, made conservancy in the modern sense at last possible, and the administration was then free to attack its next great problem—the provision of ‘a diffused and regular supply of pure water for drinking and other purposes.’ In the earliest times Calcutta had been dependent for its supply on the river and on its tanks and wells.

The Great Tank (Dalhousie Square) was deepened and extended in 1709, to ensure a good supply of sweet water for the garrison of old Fort William, and British Calcutta, as we have seen, grew up near its banks. In the course of time many private tanks were excavated, and through neglect fell into decay.

Between 1805 and 1836 came the splendid works of the Town Improvement and the Lottery Committees. The provision of a water supply was not overlooked; the excavation of large tanks in Cornwallis Square, College Square, Wellington Square, and Wellesley Square, of Mirzapore and Soortibagan Tanks, and several tanks in Short’s Bazaar, proved an inestimable boon to Calcutta. In 1820 a small pumping plant was set up at Chandpal Ghât for lifting river water into open masonry aqueducts, which distributed the water by gravitation over a small portion of the town (Old Court House Street, Dhurru-



tollah, Chowringhee, Park Street, part of Chitpore Road, Lall Bazaar, Bow Bazaar, etc.).

We are told that Messrs. Jessop and Co. worked the engine by contract at Rs400 a month, running it seven hours a day for eight months in the year. Water could be taken from the aqueducts by pails, while the supply was also used for street watering and for replenishing public tanks in its vicinity. Private wells were plentiful, but were even more dangerous sources of supply than the foul and insanitary privately owned tanks, which were so abundant in the northern part of the town. The Fever Hospital Committee throws an interesting light on the water supply of its time.

‘ Good tanks and clean well-repaired wells ’ were rare ; river water, drawn at the ebb and preferably about the tenth day of the moon, was most generally used by the Hindu inhabitants, except those who lived at a distance from the Ganges and were too poor to pay for Bhangies or water-carriers. From October to March the river water was said to be wholesome for drinking and culinary purposes ; from April until the break of the rains it was saline ; in autumn the water was turbid, and it was customary to clarify it by the use of alum or muslin strainers. Some people collected river water in February, and stored it in jars until the rains ; the more wealthy often brought water from Hughli or Khulna.

The poorer Hindus and Muhammadans generally used tank water, which the latter frequently purchased from Bhistees, who sold a mussack containing 8 gallons at $\frac{1}{4}$ anna. Europeans often used rain water, which they stored in common Pegu jars. Mr. Scott Thomson, examined by the Committee, stated that his firm obtained their supply for the manufacture of soda-water from the Lal Dighi in Tank Square.

‘ The only purifying process it undergoes is filtration through a bed of sand and charcoal . . . *previously immersing in each Pegue jar a red-hot iron, to destroy the animalculæ.*’¹

He frequently supplied water ‘ to persons proceeding

¹ The italics are mine.—S. W. G.

to sea,' and describes how 'one lady who took a stock of it with her on the homeward voyage, wrote to him from Liverpool that she had produced a bottle of it at that port . . . and it was not surpassed in either sweetness or transparency.' ¹

In Act II. of 1848 we find the first explicit recognition by the Legislature of the need for a supply of pure and wholesome water. In 1853 the Commissioners spent Rs5631 in repairing the public tanks; in 1854 the expenditure was Rs5775. In the latter year (1854) the system of aqueducts was extended to Wellington Street, Wellesley Place, and College Street, contributions to the cost being obtained both from Government and from the public. This year was also notable for the appointment as Secretary of Mr. W. Clark, M.I.C.E., to whose ability and skill Calcutta owes much. The Commissioners had long had in contemplation the erection of a second engine at the northern end of the town, for which there existed a special fund of over Rs25,000, but the scheme had been suspended in consequence of the elaborate drainage proposals, which materially affected it. Clark at this stage wrote a short note discussing the advantages and drawbacks of the aqueduct system. On the one hand could be placed the smaller initial cost, the ease with which silt deposits could be removed, and lastly, the facilities which the system offered for street watering by means of bheesties.

Against these advantages he placed the following defects :—

- (1) The limited elevation of the aqueducts, and consequently the limited area which they served ;
- (2) The space which they occupied in the streets ;
- (3) The frequent repairs which leakages entailed ; and
- (4) The loss of energy in pumping the water, which was wasted through leakage.

He recommended the use of cast-iron pipes laid underground, through which water might be forced from Chandal Ghât with a pressure of 30 feet. At intervals of 100

¹ Vol. i. p. 50, F.H.C. Report.

yards hydrants might be placed for street watering, fire-extinguishing, and flushing purposes. The Commissioners, however, on the grounds of expense and delay in obtaining materials from England, did not favour the innovation.

His great drainage scheme occupied all Clark's energies for the next few years, but by 1862 the work was in full progress, and he and the Commissioners found an opportunity of dealing with the hardly less important question of water supply.

Between December 1861 and January 1863 Dr. MacNamara was deputed to carry out an elaborate set of analyses of the Hughli water. 'The water was taken monthly from the centre of the stream at 6 feet below the surface and from three stations, namely, from opposite Cossipore, Pulta Ghât, and Chinsurah.'

He found that the Cossipore water was tainted by sewage, and the scheme of placing the intake pipes at this point, which its cheapness had recommended, was abandoned. The analyst reported that water drawn either at Pulta or Chinsurah was comparatively pure, and after settling and filtration would afford a pure and wholesome supply, though he personally favoured a scheme for turning the Maidan into a catchment area and source of supply. Clark's original scheme provided for a daily supply of 3 to 4½ million gallons of water, at an estimated cost of 11 to 13½ lakhs of rupees.¹ In 1863 he was sent on deputation to the United Kingdom, in order that he might profit by the latest Western experience in drainage and water supply. In 1865 he submitted a full report on the Pulta scheme, which was approved in its entirety by the Water Supply and Finance Committees of the Corporation, who recommended that the works should be carried out by contract under the Justices' supervision instead of the supply being placed under the control of a Water Company, that a loan should be raised, and that section 61 of Act VI. of 1863 should be amended to make the levy of a water-rate *compulsory* on the completion of the works.²

¹ Equal at that time to £110,000 to £135,000.

² In 1860 Government had agreed to sanction a loan for water supply; Act VI. of 1863 already authorised the levy of a water-rate.

FIRST CALCUTTA WATERWORKS (FILTERED)

The works were designed to supply 6,000,000 gallons of filtered water per day to a population estimated at 400,000 persons. The surface of College Street and Cornwallis Street varies between 19 and 24 feet above datum (Kidderpore Dock Sill) ; farther north at Tallah, the average level of the ground is 18 feet, and thence with slight undulations the surface rises to an average level of 30 feet above datum by the riverside at Pulta, there being thus a fall of about $11\frac{1}{2}$ inches per mile between Pulta and Tallah. In order to obtain the full advantage of the fall and to avoid the depreciation which iron pipes were expected to undergo owing to the saline nature of the soil, Clark was in favour of conveying the water from Pulta by a brick aqueduct instead of through iron pipes, but his views were subsequently modified. The works as executed consisted firstly of a pumping-station with three 50 H.P. engines on the river bank at Pulta, by which water was lifted into large masonry settling-tanks. After depositing as much silt as time permitted, the water gravitated on to twelve slow sand-filters, and passing through these the filtrate was collected in a central well. From this well it gravitated through a 42-inch cast-iron pipe ¹ (capable under favourable conditions of discharging 8 million gallons per day) into an underground reservoir at Tallah Pumping-Station, just outside the northern boundary of the city. At Tallah another pumping plant delivered the water, partly to consumers and partly into another underground reservoir at Wellington Square. Another pumping-station was built here, and the distribution was completed from this point. The settling-tanks were six in number, each 500 feet by 250 feet in surface dimension, and with a depth varying from 7 feet at one end to 9 feet at the lower end.

The available storage capacity of each tank was thus $4\frac{1}{4}$ million gallons, giving an aggregate capacity for the six tanks of nearly 26 million gallons. The filter-beds

¹ The level of the invert is 22 feet above datum (Kidderpore Dock Sill) at Pulta and 12 at Tallah, with a fall of 10 feet.

were twelve in number, each 200 feet by 100 feet, with a depth of from 5 feet 7 inches to 6 feet 1 inch. The filter medium consisted of a 30-inch layer of very fine Pulta sand on the top of a 6-inch layer of coarse Magra sand, the whole resting on a bed of pebbles, varying from fine gravel to stones as large as eggs.

The total thickness of the filter-bed varied from 3 feet 10 inches to 4 feet 4 inches. Each tank was calculated to let through a million gallons in the twenty-four hours. The filters were cleansed by scraping off the surface of the filtering medium from time to time until a clean surface of sand was reached, the soiled sand being ultimately washed and made fit for use again. The reservoirs at Tallah and Wellington Square had capacities of 1 million and $6\frac{1}{4}$ million gallons respectively. The works were constructed by Messrs. Brassy, Wythes, Aird and Sons, under the immediate supervision of Mr. Smith, a P.W.D. engineer, whose services were lent by Government. The total cost appears to have been 66 lakhs, as against an estimate of 57 lakhs. Mr. Smith submitted a report on the 18th November 1869, in which he described the tests which had been made on the main between Pulta and Tallah, and recommended that the works should be taken over from the contractors. According to the contract, the main was to stand a pressure of 100 feet, as it was realised that with an increased demand it might become necessary at some future time to force the water through the main from Pulta at a high pressure.

Waterworks taken over by Corporation in 1870.—During the tests it was not considered advisable to apply a pressure of more than 40 feet, and even so Sir Stuart Hogg had to announce to the Justices that the main had burst at about sixteen points. Mr. Smith was not alarmed, but was prepared to stake his professional reputation on his belief that the main for all practical purposes was a sound piece of work. He was of opinion that it would strengthen as it settled in the soil, and that in any case it would never be required to support a higher pressure than 40 feet. The Justices not unnaturally were suspicious of the quality of the work,

and were for insisting on an adherence to the letter of the contract. On the point of law, they were strengthened by the opinion of the Advocate-General, who, however, in view of counterclaims by the contractors for work done outside the contract, advised an amicable settlement of the dispute.

On the 23rd February 1870 it was decided that the works should be taken over from the contractors, on condition that they should be responsible for the main pending the submission of the whole question to arbitration. The main proved to be sound, and the Corporation subsequently waived its claim for damages on the contractors giving up their claim for compensation. In 1870 we find that all the principal streets and lanes (385 in number) had been piped, the total length of piping aggregating $111\frac{3}{4}$ miles. Over 500 standposts were erected in the streets and made accessible to the public.

Towards the end of 1870 the daily consumption was $4\frac{1}{2}$ million gallons, and a rapid increase in the demand was apprehended by the Justices. They agreed to give water to the Calcutta Cricket Club, whose ground was not included in the municipality, at R1 per 100 gallons, but refused to supply water to Government buildings in Alipore and other places, then outside the town limits; and though in 1871 they rescinded this resolution so as to supply water to such premises at a rate of R1 per 1000 gallons, the supply was to be continued only so long as the needs of the town were satisfied by the volume of water which could be brought through the Pulta main by *gravitation*. In 1870 a third engine was ordered for the Wellington Square Pumping-Station, but in 1871 the Justices hesitated to sanction the expenditure of over Rs10,000 for cleaning the Pulta filters, and it was only after inspecting the settling-tanks, which had begun to leak, that they agreed to a layer of cement being placed in one tank as an experiment. There can be no doubt that the Justices had some cause for complaint, but some reflections on the continuity or eternal recurrence of ideas are suggested by the fact that some of the inspecting committee advocated that Mr. Clark's expert advice



should be strictly followed, while others were not prepared to admit this theory, maintaining that it was the duty of the Engineer to advise, and of the Justices 'to view the point at issue in all its practical and financial bearings, and then to decide.'

ADDITIONAL WORKS

It was soon found that the working of the filters was unsatisfactory during the rainy season, 'the too limited accommodation for filtration' being in Clark's opinion the weakest point of the waterworks. In 1871 the Engineer proposed to increase the number of filters, and to make other extensive works, estimated in all to cost nearly 20 lakhs. The problem of waste now began to assume great prominence. He pointed out that the number of house connections¹ was 2316, that judging by the experience of Bombay another 3000 connections might eventually be expected, and that there was reason to fear that a daily supply of even 12,000,000 gallons might soon prove insufficient. As a measure of economy, he advocated the extension of the unfiltered water supply, to serve more generally for street watering, fire-prevention, and trade purposes. As an 'absolute guarantee against waste,' he urged that the Justices should fix meters on each premises connected with the supply, and recoup their outlay by charging rent for their use. He proposed also that an additional reservoir to hold 6,000,000 gallons should be constructed at Tallah to guard against the great inconvenience which would be caused by temporary damage to the Pulta main. Sir Stuart Hogg, and later Lord Ulick Browne, Officiating Chairman, submitted modified proposals to the Justices. By the 31st March 1872 the number of premises connected with the waterworks was 3702, while the average daily consumption in that month had amounted to 7,156,488 gallons.² It was proved by careful experiments that the 42-inch main

¹ On 28th December 1871.

² This figure was certified to be the result of careful observations, yet the daily consumption in February 1872 was only 4,756,784 gallons.

from Pulta could be safely relied on to pass under existing circumstances and *without pressure* 8,338,000 gallons a day, and it was therefore clear that if sufficient engine power were provided at the only place where it was deficient, viz. at Tallah, the supply could be increased to that amount.

Neither Sir Stuart Hogg nor the Officiating Chairman recommended the introduction of house-meters, both on the ground of cost and because they believed that the saving in water would not compensate for the discontent which the innovation was likely to cause. The net result of the discussion which followed was the erection of an additional engine at Tallah, the strengthening of the pumping plant at Chandpal Ghât, and the extension of the unfiltered water supply. The latter measures were carried out at a cost of Rs2,46,385, and effected a saving of 1,330,000 gallons daily in the consumption of filtered water.¹

Proposals for Extension of Works.—The supply of filtered water, however, did not exceed 7 million gallons daily, and it soon became evident that the works must be considerably enlarged. In 1876 Mr. Bradford Leslie, Engineer to the Justices, in a memorandum dealing with the financial aspect of the question, and containing the novel proposal that the sinking fund established to liquidate Government loans on account of drainage and water supply works should be abolished, and the interest charges placed *in perpetuum* upon posterity, stated that an amount of Rs44 lakhs was still required to complete the city drainage and to increase the water supply to 12 million gallons per diem. But it soon appeared that the estimate was far too low, and the Water Supply Extension Committee in their first report, dated the 16th June 1880, proposing to increase the filtered supply to 12,000,000 gallons per diem and the unfiltered supply to 4,000,000 gallons, placed the capital outlay of the scheme at Rs30,80,133 (for filtered supply) and Rs2,68,194 (for unfiltered supply); the revised estimate in 1881 amounted to Rs41,13,478, and in the following

¹ Unfiltered water pipes were laid in thirty-three streets, aggregating a total of 25½ miles (13th July 1874). The unfiltered water supply is referred to in more detail on pp. 203-205.

year to Rs49,71,400. There were great differences of opinion as to whether, from the sanitary point of view, a new masonry culvert, 62 inches in diameter, from Pulta to Tallah would be a safer form of conduit than an open cut, filtration at Tallah being provided in either case; the open cut was admittedly much less costly.

It was however finally decided that a second iron main, 48 inches in diameter, would give the desired increase in supply at an extra cost over the open cut scheme of about Rs10 lakhs, filtration at Tallah being unnecessary; and it was agreed that the avoidance of all risk of contamination was well worth the additional outlay. The important decision was also taken to obtain the additional capacity required for settling purposes, by constructing new earthen instead of masonry reservoirs. In making the above recommendations, the Committee were influenced by three general propositions:—

- (1) Relying upon the results of recent censuses, they were inclined to agree with Beverley's theory that the population of Calcutta and its suburbs had reached its high-water mark, and that special conditions, viz. the existing pressure upon a circumscribed area, the increasing use of machinery or labour-saving appliances, and the excessive preponderance of the male element in the population, would so greatly affect the law of natural progression that it would not suffice to maintain the population in *statu quo*, much less add to its numbers;
- (2) They calculated the 'life' of an iron main as one hundred years; and
- (3) They foresaw the probable necessity at some future time of providing extra reservoir accommodation at Tallah, or at some other place in or near Calcutta, in order to ensure a reserve supply in case of accident to the main conduit, to store by night a supply for distribution by day, and to equalise any possible fluctuations in the action of the Pulta filters.¹

¹ In the end additional reservoir accommodation was included in the new works, as stated below.

The new works, which were not completed for some years, may now be described.

NEW WORKS OF 1888

In 1888 a new pumping-station was erected at Pulta, about half a mile distant from the old station. Three 75 H.P. pumping-engines were installed, and ample provision for settling purposes was obtained by the excavation of four large 'kutchas' reservoirs; two of them 2060 feet in length by 230 feet in width, and two 2060 feet by 335 feet, with a total useful capacity of 82,750,000 gallons. Twenty-four additional filter-beds were also constructed, each 200 feet by 100 feet. To convey the increased supply of water to Calcutta, a new 48-inch cast-iron pipe,¹ 66,000 feet in length, was laid between Pulta and Tallah. The works at Tallah were strengthened by the addition of two new pumping-engines, while the reservoir accommodation was increased from 1 to 3 million gallons. An additional pumping-engine was installed at Wellington Square Station, and a new pumping-station was constructed at Halliday Street, with four beam-engines and an underground reservoir of 4 million gallons capacity.

For the supply of the southern suburbs newly incorporated in the Municipality, a new pumping-station was built at Bhowanipore, which was fitted with two triple-expansion Worthington engines, and provided with an underground reservoir of nearly 3,000,000 gallons capacity. The new works were completed in 1891. Subsequent minor alterations included the installation of a new Worthington pumping-engine at Tallah, capable of raising 900,000 gallons per hour (1894), and of two triple-expansion Worthington engines (1898)² of much greater power than the old beam-engines. The total cost of

¹ The level of the invert at Pulta is 21·4 feet above datum (K.D.S.) and at Tallah 10·27, the fall being 11·13 feet. The pipe was laid in 1887, and like the 42-inch main discharges into the underground reservoir at Tallah.

² Their maximum delivery was 495,000 gallons per hour.

the filtered-water works up to 1891 was computed at Rs1,42,72,000, of which nearly half was spent on extensions of the original scheme.

DETAILED ACCOUNT OF SETTLING-TANKS, FILTER-BEDS, ETC.

It has already been stated that the six original settling-tanks were constructed entirely of masonry. Four of them were provided with a series of silt-catching pits, but in practice no particular advantage is found to be gained by their use. The new settling-tanks, which were made in 1888, are of a different type. After the excavation had been done, the soil was deposited in layers of 1 foot in thickness, and consolidated with water to form the banks; except in one tank, on the side nearest the filter-beds, no puddling was done. Subsequently, several breaches having occurred in September of 1888, strong bamboo piles were driven in at the toe of the slope of the repaired banks to prevent erosion, and the banks pitched with rough-dressed stone. Other portions of the banks were pitched at the water-level with bricks set on edge. The percolation from the tanks is remarkably small, the ascertained loss in depth being only $\frac{3}{4}$ inch in 24 hours, and of this $\frac{5}{8}$ inch is accounted for by evaporation.

Filter-beds.—The original filter-beds have already been briefly described. It may be mentioned that after passing through the filtering medium the water is collected in small cross-drains 4 inches square in cross section, covered with tiles spaced to permit the water to pass through.

The cross-drains deliver the water into collecting drains laid along the middle of the filters, and these in turn deliver into the collecting-well, from which the water flows directly into the conduit pipes. The filter-beds of 1888 consist of two courses of dry bricks, properly spaced to permit the passage of water, overlaid with 4 inches of Magra or coarse sand, and topped as before with 30 inches of fine river sand. The old and the more modern filters

appear in point of filtration equally efficient, but the latter are simpler and cheaper in construction and more easily cleaned. The sand is replenished when its thickness has been reduced by continual scrapings to 1 foot.

The most satisfactory results have been obtained from an average rate of filtration of 40 gallons per square foot per day of 24 hours, the head of water varying between 3 inches and 20 inches. The filtrate is clear and bright except at the commencement of the rains, when an opalescent tinge is noticeable, which is thought to be due to iron and other compounds washed from the upper watershed by the first heavy rains. The water is periodically analysed, and compares very favourably with that supplied to other large towns. The only suspicious feature in the bacteriological test is the continued presence of the bacillus *Coli communis*, which however is common to most Indian surface-waters. Fine sand is obtained in abundance from churs or sandbanks in the river near Pulta. Magra or coarse sand is obtained from the Magra district, while pebbles are collected from the surface of the ground in Raneegunge district. Masonry tanks, about 12 feet square by 3 feet in depth, with false bottoms, under which water from the settling-tanks is introduced, are used for washing the soiled sand of the filters. The objectionable feature in this method is that it requires men to stand in the tanks to agitate the sand. Experiments made with mechanical washers did not yield satisfactory results, but further experiments in this direction have been sanctioned.

Conduits.—The 48-inch and 42-inch conduits laid between Pulta and Tallah consist of cast-iron pipes with turned and bored joints. They were working under heads of 12·2 feet and 9·5 feet respectively under the system now being described, and their calculated discharge when running full (by the Kutter formula, taking the value of n as nil) was as follows :—

	Gallons per 24 hours.
42-inch pipe . . .	7,640,000
48 " " . . .	12,616,000
Total . . .	20,256,000

Distribution.—The underground reservoirs at the distributing stations (Wellington Square, Halliday Street, and Bhowanipore) were filled at night from the Tallah Pumping-Station; the water being conveyed along the 30-inch *independent pumping main*. The engines at the pumping-stations completed the distribution into the service main.¹ The trunk mains varied between 9 inches and 30 inches in diameter, parallel services between 6 inches and 3 inches in diameter being provided for mains exceeding 1 foot in diameter. The total length of mains and service pipes in use in connection with the filtered supply under the system of 1888 was 315 miles.

Pressure.—The pressure in the mains varied greatly in different parts of the town. The system of supply was of the intermittent type, a pressure of 50 to 80 feet being maintained at the distributing stations from 6 A.M. to 10 A.M. and from 3 P.M. to 6 P.M. The terminal pressure was however in some parts of the town not more than 10 feet. A low pressure sufficient to serve the stand-posts was also maintained in the middle of the day in the more thickly populated portions of the town. There was no supply at night. The filtered-water works, as extended in 1888, were designed to furnish a daily supply of 20½ million gallons, of which a small portion (originally about 300,000 gallons daily) was made available for the Barrackpore Cantonment and the small suburban municipalities of Dum-Dum, Cossipore-Chitpore, and Manicktollah.

- By 1893 the maximum available supply was being used, and with the growth of population the demand gradually increased until, with the inevitable fall in pressure, complaints of scarcity became numerous.

SCHEMES FOR ADOPTION OF THE CONTINUOUS SYSTEM OF SUPPLY

In April 1901 Mr. Deverell, Engineer to the Corporation, drew attention to the provisions of section 241 of Act II. of 1899, enjoining the introduction of a *continuous*

¹ Water was also pumped direct from Tallah into a 30-inch trunk main.

system of supply, and adopted the proposal first made by Mr. Peirce, Assistant Engineer, to introduce a constant supply through the medium of elevated reservoirs.

Mr. Peirce proposed to abandon the three pumping-stations at Wellington Square, Halliday Street, and Bhowanipore and to substitute a system of gravitation, the pumps at Tallah being utilised to raise the water into an elevated steel tank or reservoir. In his final report he proposed to construct two such reservoirs, one for the north and east and the other for the south of the town.

These tanks were to be raised from 60 to 80 feet above ground-level. The underground reservoir accommodation at Tallah was to be increased from 3 to 8 million gallons, and the mains improved by the substitution of larger pipes where necessary; waste was to be checked by means of the Deacon waste-water meter system. Mr. Deverell, while agreeing generally with Mr. Peirce, proposed to retain the Bhowanipore Pumping-Station and to construct six elevated reservoirs instead of two. Mr. Peirce estimated the cost of his scheme at Rs18 lakhs, the principal items being 6½ lakhs for the two raised tanks, 4½ lakhs for new distributing mains, and 2½ lakhs for the new reservoir at Tallah. The cost of Mr. Deverell's alternative scheme was estimated at Rs20,16,000.

The Corporation decided to obtain the views of Government upon these proposals, with the result that Mr. Buckley, Chief Engineer to the Government of Bengal, and Mr. Silk, Sanitary Engineer to Government, were deputed to report upon the schemes. In November 1901 they advised against the adoption of the proposals to substitute gravitation from elevated reservoirs for the existing system of pumping direct into the mains. They insisted upon the importance of checking waste, and considered that if the distribution were brought under proper control there would be no need to increase the supply.

They agreed that the reservoir accommodation at Tallah should be increased by 5 million gallons, with the double object of securing a larger reserve of water in case of accidents and of permitting a more even and thereby more economical use of the Tallah engines. They also

proposed to increase the pumping power at Tallah, Wellington Square, and Bhowanipore, and to lay a new distributing main from Tallah to Shambazaar. The cost of their scheme was estimated at Rs19,79,994. It was adopted by the Corporation on the 7th May 1902, and the work was taken in hand without delay. It should be noted that Messrs. Buckley and Silk were swayed, perhaps unduly, by financial considerations; they believed that the estimates of the Corporation engineers would be much exceeded, and they were loth to sacrifice the large amount of capital already sunk in the existing system of distribution, if it could be modified so as to meet new conditions at a moderate cost. They believed that an average daily supply of 20 gallons of filtered water per head of population, combined with the development of the unfiltered supply, was adequate, and they assumed that meters would be freely used to check consumption in excess of the statutory scale of 4000 gallons to each rupee of water-rate.

MR. MACCABE'S PROJECT

The new works had not proceeded far when Mr. W. B. MacCabe was appointed as Chief Engineer to the Corporation (October 1903). He had been specially selected by Mr. Buckley in view of his reputation as a Waterworks Engineer.

On the 23rd November 1903 he submitted a fresh scheme, the principal features of which were—

- (1) The laying of a new 48-inch main from Pulta to Tallah, at an estimated cost of Rs21,50,000, to deliver an additional supply of 12 million gallons of water.
- (2) The substitution of gravitation for pumping as a method of distribution.

An elevated reservoir, estimated to cost 8 lakhs, and capable of holding 3 to 5 million gallons at a height of 85 feet, was to be constructed at Tallah. On the

1st March 1904 Mr. MacCabe submitted a complete estimate of Rs32,51,165, exclusive of the cost of the new 48-inch main, proposed to be laid between Pulta and Tallah.¹ In the meantime, pending consideration of the larger scheme, an additional supply of 6 million gallons a day was obtained at a cost of Rs99,631, by installing pumps at Pulta to put a pressure of 15 feet on the existing mains. It had always been doubted whether these mains were in a sufficiently sound condition to carry water under pressure; the Chief Engineer's opinion was however reassuring, and was more than justified by the results when the pumps were installed on the 25th July 1905. As to the main scheme, the Corporation decided to obtain the expert advice of Mr. James Watson of Bradford. After a careful study of the problem, he advised that Mr. MacCabe's project should be adopted, recommending at the same time that the capacity of the elevation reservoir should be increased from 5 million gallons to 7,300,000 gallons, for an assumed daily supply of 30 million gallons. He questioned, however, the expediency of retaining the unfiltered water supply.

MODIFICATIONS IN MR. MACCABE'S PROJECT 1905-1908

His report was adopted by the Corporation, and in April 1905 Mr. MacCabe submitted a revised estimate²

¹ DETAILS OF ESTIMATE

I. *Common to Mr. MacCabe's and Messrs Buckley and Silk's schemes.*

(1) New reservoir and pipes at Tallah	Rs3,11,800	
(2) Meters, sluice-valves, and stop-cocks (for checking waste)	4,68,427	
(3) New delivery mains	6,50,938	
(4) Contingencies	25,000	
		Rs14,56,165

II. *New Items.*

(5) Trunk main (Tallah to Wellington Square)	6,00,000	
(6) Delivery pipes to raised reservoir	40,000	
(7) Raised reservoir to hold 5 million gallons	11,25,000	
(8) New pumping machinery, etc., Tallah	30,000	
		<u>17,95,000</u>
Grand total		Rs32,51,165

of Rs82,40,000, which provided for a daily supply of 50 million gallons of *filtered* water to serve for all purposes. A careful examination into the requirements of the city for water for domestic and non-domestic purposes was made. In 1882, before the increased unfiltered water supply had become generally available for street watering and flushing purposes, 30 gallons daily per person had been accepted as an adequate supply, while Messrs. Buckley and Silk had considered that a supply of 20 gallons of filtered water per head would suffice, if waste were sternly checked.

Mr. MacCabe adopted a basis of 30 gallons per head of filtered water for domestic purposes. Practically the whole of the northern part of the town had been brought under the constant supply system in 1905 on the completion of the new reservoir at Tallah, and the authorities were disconcerted at finding an average daily consumption of 45 gallons per head in some portions of this area, although the average daily consumption throughout the whole area under continuous supply was only 27·3 gallons. The Corporation was of opinion that if the system of water supply were to be completely overhauled, the project adopted should furnish a satisfactory solution of the problem of supply for the next twenty-five years. They considered 30 gallons per diem per head of population (in addition to the unfiltered water supply) an adequate allowance, and anticipating that the population of Calcutta in 1930 would not exceed $1\frac{1}{4}$ millions, they estimated that a daily supply of $37\frac{1}{2}$ million gallons would ultimately be required. It was estimated that a provision of $2\frac{1}{2}$ million gallons daily would suffice for the requirements of the outlying municipalities¹ and Dum-Dum Cantonment.

A daily supply of 40 million gallons of filtered water was thus thought to be ample provision for all probable needs for the next twenty-five years.

It was believed that a daily supply of 25 million gallons of water might be required by 1930 for non-domestic

¹ Cossipore-Chitpore, Manicktollah, Garden Reach, South Suburbs, South Dum-Dum, and Tollygunge.

purposes.¹ The expenditure involved in providing filtered water for these purposes was estimated at 40 lakhs. The cost was considered as prohibitive, and the Corporation decided to limit its project to the daily supply of 40 million gallons of filtered water.

The Sanitary Board were opposed to the use of a covered masonry aqueduct, which the Chief Engineer had proposed to construct between Pulta and Tallah, while the cost of an iron main of the requisite size would not be less than 40 lakhs. Mr. MacCabe met the difficulty by submitting a revised scheme in February 1906, in which he proposed to put sufficient pressure upon the existing 48 and 42 inch mains to increase their carrying capacity to 32 million gallons daily, with provision for expansion, when needed, to 40 million gallons per day. This suggestion was finally approved. Mr. MacCabe's project, as finally presented, was estimated to cost Rs69,17,874. The sanction of the Corporation was obtained on the 18th December 1907, and the sanction of the Government of Bengal on the 5th March 1908.²

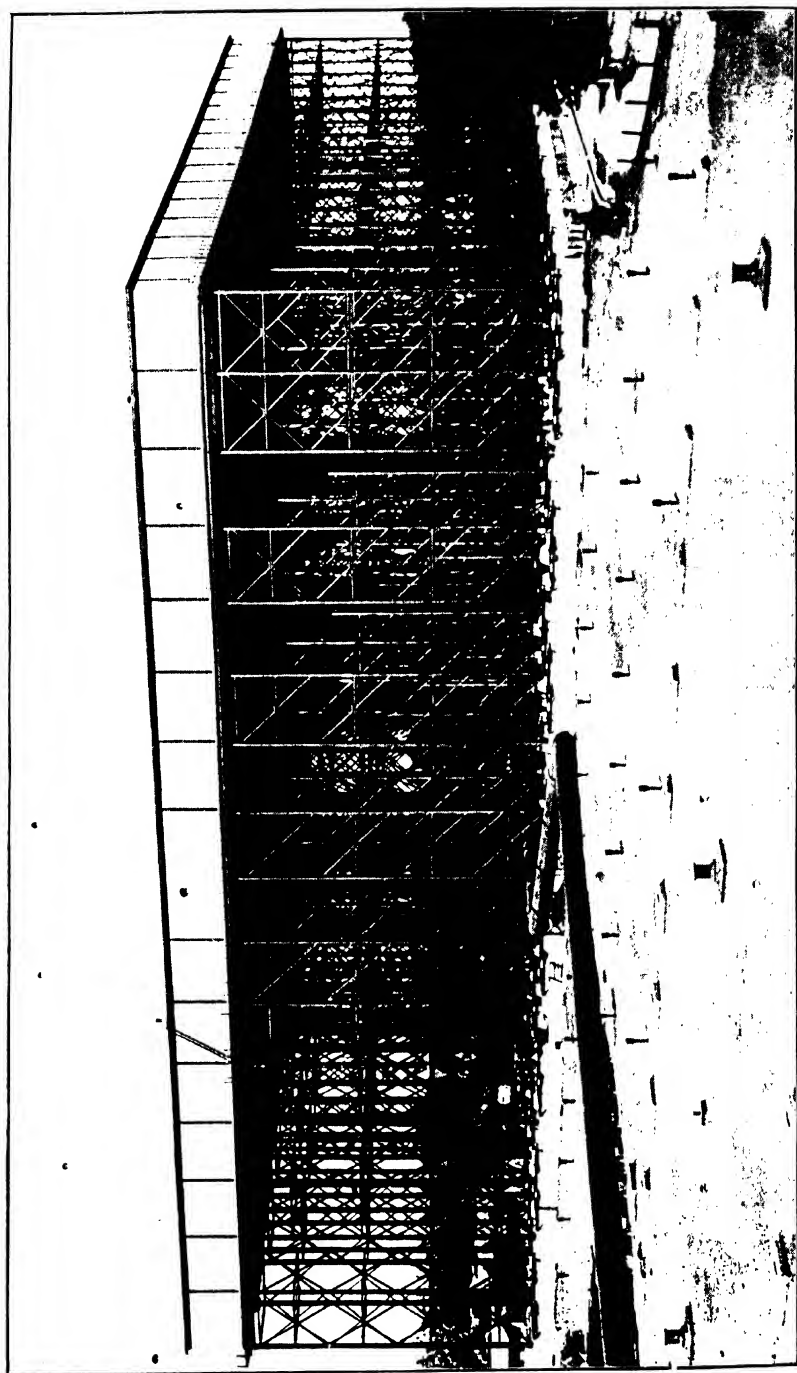
The scheme comprised the following works, which were duly executed :—

- (1) Erection of new pumping machinery, station, and jetty, suction and delivery pipes for pumping water from the river into the Pulta settling-tanks.³
- (2) The construction of five large filters at Pulta.
- (3) The installation of a 300 B.H.P. Diesel oil-engine, and centrifugal pump at the centrifugal pumping-station at Pulta, with engine-house, for putting pressure on the 48 and 42 inch mains.
- (4) Installation of three 300 B.H.P. Diesel oil-engines with turbine pumps and engine-house at Tallah to raise the increased supply of water into the elevated reservoir.

¹ In 1913-14 the average daily supply of unfiltered water is already 22½ million gallons.

² Some of the details of the scheme were sanctioned at earlier dates, e.g. the new underground reservoir at Tallah was sanctioned by Government on the 12th December 1903.

³ The old compound condensing-engines of 1869 were sold in 1912 at public auction for Rs5500.



- (5) The construction of a 9 million gallon steel elevated reservoir.
- (6) The laying of a new main from Tallah to Wellington Square.¹

ELEVATED RESERVOIR AT TALLAH

The most striking feature in the new project was the overhead reservoir. Its essential function was to enable the pumps at Tallah to be worked at one constant head, and speed, instead of being pressed or retarded to conform to the fluctuating demands of the consumer, which varied from about 7.5 gallons per head at night to perhaps 75 gallons per head during each hour of maximum demand. The obvious means of overcoming the difficulty was to create a reserve during the hours of minimum demand for use during the period of maximum demand.

The necessary degree of elasticity in the method of supply, so as to render it capable of varying automatically with the demand, could only be secured by the force of gravitation which, provided that the system is designed to meet the maximum demand, must automatically adjust itself to any demand short of the maximum. The overhead tank, as Mr. Peirce saw in 1901, furnished the solution to the problem. This reservoir consists of a steel tank 16 feet deep, 321 feet square, supported on steel columns, the height from the top of the tank to the ground-level being 110 feet. It has a capacity of 9 million gallons. The tank is divided into four compartments, which can be used independently of each other, so that one or more compartments can at any time be thrown out of work for cleaning or repairs, without any interruption to the town supply.

¹ It might appear strange that no increase in the storage capacity of the settling-tanks was found to be necessary. Since 1905 aluminoferric has been used with great success during the rains to promote precipitation of matter held in suspension in the crude Hughli water. It would be more economical to use aluminoferric for this purpose throughout the whole year, if it were necessary, rather than to incur large capital expenditure in increasing the capacity of the settling-tanks.

To protect the water from possible contamination and from the blazing sun, the tank is provided with a flat terrace roof consisting of $2\frac{1}{8}$ inches of fine concrete, carried on slates laid between steel rafters; the rafters are carried on steel joists, supported by steel columns, superposed on the main columns of the structure. Between the slates and the concrete is a watertight roof consisting of a layer of bitumen compound, then a thickness of Pabco, then another layer of bitumen, and finally a thickness of Pabco with a white (asbestos) finish.

• The foundations, in view of the well-known deficiencies of the soil of Calcutta, were constructed with the greatest care.

The site contained several old tanks; these were first dewatered, then 'piled' with *sâl* bullah piles 20 to 25 feet long, and filled in with *jhama khoa* well rammed, a retaining wall of piling and concrete being constructed to prevent any lateral displacement of the soil beneath the foundations. The whole area was then consolidated by heavy steam-rollers, after which a 9-inch *khoa* bed was laid down and rolled in, as if a road were being constructed. Upon this bed the foundation proper was laid, consisting of a bed of cement concrete 2 feet 6 inches in thickness, reinforced near its base by flat steel ties, and near its surface by a system of rolled steel joists, upon which the bases of the main columns rest. The water contained in the tank weighs some 40,000 tons and the structure about 8500 tons; including the ferro-concrete foundation, the load on the soil is about 12 cwt. per square foot, which leaves a large margin of safety even in the treacherous soil of Calcutta.¹

CIRCULAR CANAL BRIDGE

The Circular Canal was formerly bridged near Tallah by a wooden structure, which was unequal to heavy traffic. When the waterworks were first designed, it

¹ The contractors for the preparation of the foundation were Messrs. T. C. Mukerjee and Co.; for the reinforced concrete foundation, Messrs. Martin and Co.; for the tank itself, Messrs. Clayton, Son and Co., Leeds; and for the roof the Arracon Co. and Babu Kali Sunker Mitter.

was found impracticable to lay the main from Pulta on the bed of the canal, and it was therefore decided to take it over the canal by a substantial iron bridge, the cost of which was estimated at Rs50,000. Government agreed to contribute half the cost of this work, on condition that the bridge when completed was handed over to the Department of Public Works, which however was to incur no responsibility for the pipe. The bridge was completed and thrown open to the public in 1869; it was subsequently enlarged and strengthened, and now constitutes one of the main approaches to the city from the north.

NEW MAINS

To obtain the most favourable results from the elevated reservoir, it was necessary to strengthen the system of distribution mains. From Tallah to Shambazaar a steel main 6 feet in diameter was laid, while another new main, 5 feet in diameter, was laid from Shambazaar to Wellington Square.¹

RESULTS OF THE PROJECT

The new overhead reservoir, commenced on the 19th October 1909, was completed on the 12th January 1911, and brought into use on the 16th May 1911, having been formally inaugurated on the 18th November 1909 by the Lieutenant-Governor of Bengal (Sir Edward Baker).

The fear of earthquakes and the vagaries of the Calcutta soil led many people to indulge in gloomy prophesies of cataclysmic disasters, but Mr. MacCabe's faith in his tank was justified. Critics still point to the fact that Calcutta even now does not enjoy a continuous high-pressure supply of filtered water, but the Chief Engineer's scheme has given the supply he promised. In 1913-14 the quantity of filtered water supplied to the town

¹ This main runs along Circular Road and Dhurumtollah, as Cornwallis Street (the shortest route) was already overcrowded with pipes.

averaged 35½ million gallons per day, the average consumption per head of population being 32·8 gallons per day.¹ The problem which now confronts the Corporation is the question of waste prevention, and there seem to be three alternatives between which it must choose, viz.—

- (1) To extend and remodel the waterworks so as to provide a practically unlimited supply of water, which has been estimated to cost perhaps a crore of rupees ;
- (2) To acquiesce in the continuance of the existing conditions, and admit that a continuous high-pressure supply is beyond the resources of the Municipality ; or
- (3) To aim at the effective prevention of waste by extensive though not universal metering.

It remains only to note that an extra Diesel oil-engine, capable of pumping 40 million gallons of water a day, is to be installed at Pulta, while the pumping plant for the supply of Barrackpore and Ichapore Cantonments is being renewed at the cost of the Government of India.

There were at the end of 1913-14 about 2500 house-meters in Calcutta, of which over 1000 showed a consumption in excess of the statutory supply, accounting for an excess consumption of nearly one-third of a million gallons per day.

The length of filtered-water mains is now over 361 miles.²

The following statement shows the actual cost of the several portions of the great scheme just described :—

¹ Plus 25·4 gallons of unfiltered water per head per day.

² In the above account of the Calcutta Waterworks I have borrowed freely from (1) Mr. Peirce's interesting paper on the works, published in the *Minutes of the Proceedings of the Institution of Civil Engineers*, June 1902; (2) The Chairman's letter to Government, dated 14th May 1906; (3) Mr. MacCabe's lucid report on his scheme, dated November 1907. Mr. Peirce's writings on the waterworks of Calcutta show an intimate knowledge of their growth and development.

—S. W. G.

Serial Number.	Particulars.	Estimated Cost.	Actual Cost.
1	2	3	4
1	Waterworks Meter System, etc.	Rs5,19,957	Rs5,11,631
2	Centrifugal Pump at Pulta .	86,858	86,858
3	New Intake and Pressure Pump at Pulta . . .	3,83,000	3,14,115
4	New Filters at Pulta . . .	3,27,500	2,77,363
5	New Pumping Machinery at Tallah, including one Engine purchased for Wellington Square and to be transferred to Tallah . . .	4,03,850	6,18,619
6	Larger mains	5,59,178	5,59,178
7	New Reservoir at Tallah . . .	2,78,417	2,78,417
8	Overhead Tank	26,67,426	22,25,041
9	Trunk main to Wellington Square	11,00,000	10,06,515
10	Establishment	5,91,688	2,75,000
	Total	69,17,874	61,52,737

UNFILTERED-WATER SUPPLY

Reference has already been made to the auxiliary supply which Calcutta possesses in its unfiltered-water system, the small beginnings of which take us back to 1820. We have seen that in 1871, when the filtered-water supply was fast becoming unequal to the demands of the town, Mr. Clark proposed to economise its use by an extension of the unfiltered supply. His scheme was eventually carried out at a cost of Rs2,46,385, and it was estimated that the filtered supply was thereby husbanded to the extent of 1,330,000 gallons daily. Although the filtered supply was subsequently (1888) greatly increased, the advisability of abandoning the dual system does not at that time appear to have been considered, although the disadvantages of such a system are apparent.

The extension of the unfiltered-water pipes subsequent to 1871 was followed by the transfer of the Chandpal Ghât Pumping-Station site to the Port Commissioners, who made over to the Corporation a new site at *Mullick's Ghât* in Strand Road, south of the Howrah Bridge approach. New pumping machinery was installed at this site in 1885, but it made way in 1897 for the existing plant, which consists of four 300 H.P. vertical triple-expansion Worthington engines, each capable of pumping half a million gallons per hour against a head of 120 feet. Each engine is provided with a separate suction pipe laid in a tunnel under the Port Commissioners' railways up to the retaining wall at the river bank; from this point the four suction pipes are supported upon a steel screw-pile jetty. The tunnels and jetty are the property of the Corporation, which has the right of access thereto. This pumping-station supplies all the unfiltered water required for the town area.

Another pumping-station is situated at *Watgunge*, on the river bank near the mouth of Tolly's Nullah. The machinery includes two horizontal pumping-engines by James Watt and Co., each capable of pumping 300,000 gallons per hour against a head of 120 feet; these engines were formerly installed at *Mullick's Ghât*, and were removed to *Watgunge* in 1897.

The two pumping-engines draw their water from a common suction pipe laid in a tunnel from the station to a screw-pile jetty, which carries it to the water. *Watgunge Pumping-Station* supplies unfiltered water to District IV. and the Maidan.

Two separate Systems.—The unfiltered mains are divided into two separate systems supplied from the two stations described above; they can at any time be connected by means of an 18-inch pipe laid across the Maidan. The two systems are connected at the following points: Esplanade West, junction of Chowringhee and Lower Circular Road, junction of Lee Road and Lower Circular Road, junction of Lansdowne Road and Lower Circular Road, junction of Ballygunge, Circular Road and Lower Circular Road, junction of Beckbagan Lane and Lower

Circular Road, Karrya Coristhan Road and Lower Circular Road, junction of Karrya Road and Karrya Bazaar Road, and at the junction of Hazra Road and the E.B.S. Railway line. The sluice-valves at these points ordinarily remain closed.

A high pressure is maintained by the pumping-stations between 5 A.M. and midnight, except at fixed times, when the pressure on the mains is relieved to permit the execution of necessary repairs to the mains, ground hydrants, and fittings.

In the event of an alarm of fire being received, the Superintendent maintains a high pressure until he is informed by the Police that the Fire Brigade no longer requires the water.

The cost of the works in connection with the unfiltered-water supply up to the 31st March 1914 amounted to Rs47,19,610.

WATER SUPPLY TO SHIPPING

There can be no doubt that in early times the shipping of Calcutta frequently supplied itself with water for domestic purposes from the abundance which flowed past it. It was however recognised that during a great part of the year the river water of Calcutta was unfit for drinking, and the shipping was at such times supplied by contractors, who brought water in boats from higher up the river, and delivered it to the ships, after passing it through sand-filters in the boats.¹

When the waterworks were completed in 1870, the Justices agreed to sell water to the ship contractors at the rate of Rs1 per 1000 gallons, and also to deliver water direct through a hose to any vessels lying near the shore at Rs4 per 1000 gallons. These rates were shortly afterwards altered to Rs1 per ton for water supplied to

¹ *F. H. Com. Report*, vol. i. p. 51. The contractors' rate was Rs10 per 1000 gallons (Meeting of Justices, 11th June 1870).

contractors' boats and Rs2 per ton for water supplied direct on board through a hose.¹

In 1864 Dr. Chevers delivered a lecture in which he accepted and supported the theory recently adopted by the Cholera Commission, by which the propagation of cholera was attributed mainly to impure drinking water. The lecturer drew attention to the frightful prevalence of cholera amongst sailors in Calcutta, estimating the mortality at 96·48 per thousand annually, and attributing it to their reckless use of the crude river water. Government drew the attention of the Justices to the matter, but it was not until 1876 that the Port Commissioners made formal proposals to the Corporation. They were willing to construct a steamer fitted with water-tanks at a cost of Rs30,000, and to supply water to shipping at Rs8 per 1000 gallons, on condition that they were given a monopoly in the business and were supplied by the Corporation at the rate of Rs4 per 1000 gallons.

The Corporation however decided themselves to supply the shipping direct by hired country boats and a water-barge fitted with a steam-pump. The experiment was successful, and in 1878 a steam launch and two water-boats were purchased at a cost of Rs22,000. Other boats of an improved pattern were subsequently added, but the demand for water steadily grew. In 1901-2 a steam launch, the 'Lalla Rookh,' fitted with steam-pumps was purchased at a cost of Rs82,000, and in 1910-11 a second boat similar in type, the 'Theo,' was purchased at a cost of Rs94,500.

In 1902-3 meters were introduced to bring the supply under control. Four small boats, of which one is fitted with a steam-pump, are now used in addition to the 'Theo' and the 'Lalla Rookh.' In 1870 the service was controlled by the Superintendent of the River Police, who made use of the Fire Brigade establishment for the purpose. The supervision of the Police continued until 1900, a commission being paid on the collection of the water-dues,² until in 1900 a Superintendent of Water

¹ Meeting of Justices, 12th September 1870.

² Up to 1889 the rate was 1½ per cent.; it was subsequently increased to 3 per cent.

Supply to Shipping was appointed; he is under the direct control of the Chief Engineer, and the bills are realised by a bailiff, subordinate to the Collector.

The supply is delivered by seven hydrants to which meters are fixed, the shipping at the docks being supplied by meter standposts.

The charge for supplying water by Corporation boats or direct from the hydrants to ships lying below Garden Reach or at the docks is Rs5 per 1000 gallons.

A surcharge of Rs30 is made against vessels lying at Budge Budge.

The quantity of water supplied to shipping in 1913-14 was 35,664,888 gallons, for which charges were made amounting to Rs1,35,787.

SALE OF WATER ¹

Filtered water may ordinarily only be used for domestic purposes, but the Chairman may in his discretion supply filtered water for other than domestic purposes, *e.g.* for the manufacture of articles for human consumption or for cowhouses, on payment of a fixed charge.²

He may also provide unfiltered water at a charge for certain purposes to which it would otherwise not be permissible to apply³ the unfiltered supply, *e.g.* for gardens or for building operations.

Every premises is entitled to 4000 gallons of filtered water for every rupee of water-rate charged against it, the consumer being liable to pay Rs1 for every 3000 gallons used in excess of the statutory allowance. No such charge for excess can of course be claimed by the Corporation unless a house-meter has been fixed to the premises in question, and meters are ordinarily fixed when excessive waste is suspected.

Filtered water is supplied at cheap rates to the public

¹ *Vide* sections 254, 278, and 279 of the Municipal Act.

² 3 annas per 1000 gallons under the bye-laws.

³ Unfiltered water may otherwise only be used for flushing privies, urinals, drains, cleaning stables, cattle-sheds, and cowhouses occupied by animals not kept for profit or hire.

bodies noted below,¹ while private persons residing outside municipal limits may be supplied with water at 15 gallons a pice.

Water is also supplied to the Government Park at Barrackpore and the Ichapore Arms Factory at 6 annas per 1000 gallons, and to the E.B.S. Railway premises at Barrackpore at 8 annas per 1000 gallons. The total amount of water supplied in 1913-14 to all these public bodies was 463,763,845 gallons, the charges for which amounted to Rs1,26,025.2.10.

HOUSE CONNECTIONS

A separate connection with the distributing pipes is made for each premises. The work inside the premises is executed by a licensed plumber under the supervision of the Department, the connection with the main being made by the Corporation staff.

The size of the ferrule is of course dependent on the assessment of the premises, and connections in the case of new buildings are not ordinarily made until the buildings have been brought under assessment.

We are told that at the end of 1871, rather more than a year after the opening of the waterworks, 2316 houses out of 16,000 in Calcutta had been connected with the mains; the number of filtered-water house connections at the end of 1914-15 was 33,221.

Until recently connections with the filtered-water system were not allowed in the case of huts. Under the Act, however, it seems doubtful whether hut owners can be legally denied connection, and permission to connect with the mains is now freely given in the case of huts where the applicants have first made proper provision

	Per 1000 gallons.
(1) Cossipore-Chitpore Municipality . . .	4 annas
(2) South Dum-Dum „ . . .	8 annas
(3) Garden Reach „ . . .	4 annas
(4) Manicktollah „ . . .	4 annas
(5) South Suburban „ . . .	4 annas
(6) Tollygunge „ . . .	4 annas
(7) Barrackpore Cantonment . . .	4 annas
(8) Dum-Dum Cantonment . . .	8 annas

for drainage. The occupiers of huts in bustees rely for their supply of filtered water on the numerous standposts, which are placed in positions convenient and accessible to all the residents of the bustee.

In addition to the supply of filtered water for domestic purposes, the occupier of any premises, not being a hut in a bustee, is entitled to a supply of unfiltered water for flushing urinals, privies, drains, etc.

In the case of bustee premises, which are generally provided with common necessities for the general use of all the residents, permission may be given to connect a common service pipe of not less than $1\frac{1}{4}$ inches in diameter with the unfiltered main, for the purpose of flushing two or more huts in the bustee.

FINANCE OF THE WATERWORKS

The delay in providing Calcutta with an adequate supply of pure and wholesome water was partly due to the more urgent and pressing need of a drainage scheme, but financial considerations also stood in the way. Clark's great scheme was only made possible by an allotment of 10 lakhs which the Government of India made to the Justices from that portion of the income-tax which was ordinarily appropriated for public works. The Government of India also made a loan of 52 lakhs to the Municipality at 4 per cent. interest, the Justices being also required to set aside annually a sinking fund of 2 per cent. on the loan for the liquidation of their debt. A further concession, valued at $1\frac{3}{4}$ lakhs, was granted in the shape of a remission of customs duty on all waterworks stores. The waterworks, as designed by Mr. Clark, were estimated to cost 52 lakhs, exclusive of the cost of land required for the scheme and of the supervising establishment; the Justices were authorised to meet these charges, along with interest charges on the loan during construction, from the income-tax allotment.

A further contribution of Rs26,000 was made by

Government towards the reconstruction of the Circular Canal Bridge. On completion of the works, the charges for maintenance and interest on the loan were met from the water-rate, which was first levied under Act I. of 1870, at the maximum 5 per cent. on all houses, premises, and lands within Calcutta, with effect from the 1st January 1870.¹

1882-83 to 1894-95.—Between 1882-83 and 1894-95 the expansion of both the filtered and unfiltered water supply involved an expenditure of nearly 95 lakhs, of which over '83 lakhs were raised by loans,² 1 lakh was contributed by the Port Commissioners on account of the removal of the Chandpal Ghât engine, and 1 lakh by the Suburban Municipalities; the balance was met from miscellaneous receipts and contributions. The expenditure included the cost of extending the supply of filtered water to the suburbs; the outlay on account of the unfiltered-water supply amounted to more than 8 lakhs.

1895-96 to 1907-8.—Between 1895 and 1908, which may be regarded as the third period in the history of the Calcutta waterworks, nearly 67 lakhs were expended by the Corporation in improving the supply. This sum included an expenditure of 26½ lakhs on the unfiltered supply, and nearly 4 lakhs on fittings and appliances for checking waste.

1907-8 up to date.—Mr. MacCabe's big project followed, involving an expenditure of 43 lakhs, of which 18 lakhs represented the cost of the elevated reservoir.³

The total cost of the Calcutta water supply up to the 31st March 1914 amounted to over 288 lakhs of rupees; of this amount about 209 lakhs were raised by public loan, 52 lakhs were borrowed from the Government of India, 10 lakhs were granted from the proceeds of the income-tax, and the balance was met by contributions from revenue and other sources.

¹ Special Meeting of the Justices, 30th March 1870.

² 5 lakhs were advanced temporarily by Government.

³ It will be remembered that Mr. MacCabe's scheme had several works in common with that recommended by Messrs. Buckley and Silk; the items which differentiate his scheme belong in date of execution to the period beginning from 1907-8.

The present value of the abandoned pumping-stations (sites and buildings) at Wellington Square, Bhowanipore, and Halliday Street must be deducted from the gross expenditure on the water-supply system.

The sale proceeds of the old machinery and boilers at the three stations were as follows :—

Wellington Square Pumping-Station	.	Rs16,693
Halliday Street Pumping-Station	.	13,049
Bhowanipore Pumping-Station	.	10,701
Total		Rs40,443 •

Some Waterworks Statistics.—The following Table illustrates the great extensions made on the original system :—

Year.	Length of Water Pipes :		Number of Standposts.	Number of Ground Hydrants.
	(a) Filtered.	(b) Unfiltered.		
1870	112 miles	25 mi	470	511
1889-90	184 „	64 „	990	2,505
1895-96	310 „	75 „	1954	2,911
1900-01	315 „	155 „	1997	5,680
1905-06	321 „	220 „	2031	8,238
1910-11	354 „	246 „	2467	10,288
1914-15	363 „	270 „		

The number of filtered-water house connections in 1914-15 was 33,221 ; there were 25,348 unfiltered-water house connections. The number of house-meters was 2965.

CHAPTER VI

PUBLIC HEALTH

I. SANITARY INSPECTION

Introductory.—In the general account of the Health Department (pp. 63-69) some mention of its chief activities has already been made. It remains to describe in more detail the steps taken for (a) the inspection of articles of food and drink exposed for sale; (b) the regulation of cowsheds; (c) the supervision of offensive trades; (d) regulating the disposal of the dead:

In the concluding portion of the chapter, under the heading (2) MEDICAL,¹ it will be convenient to give (a) a brief account of those public hospitals of Calcutta, which though not under the management and control of the Corporation, have in their development been closely associated with the Municipality, and are now partly supported by municipal contributions; and (b) a sketch of the history of *vaccination* in Calcutta.

(a) *Food Inspection.*—As early as 1836 we find the Fever Hospital Committee recording evidence in regard to the sale of adulterated food in nearly every market in the town, and Act II. of 1848 (section 26) authorised the Commissioners to make bye-laws for seizing and destroying unwholesome articles of food exposed for sale, and for punishing the vendors. Section 22 of Act XII. of 1852, with the same end in view, gave the Commissioners larger powers for the inspection of markets, shops, and slaughter-houses. Acts XIV. of 1856 and VI. of 1863 contained somewhat similar provisions. No attempt to use these powers seems however to have been made, for from a letter, No. 684, dated 30th April 1864, written by the Secretary of the Justices to the Sanitary Commission, it appeared that 'no instance has yet occurred for the grant of a warrant for searching for,

¹ Vital statistics are dealt with in Chapter XI. (Survey and Census).

and seizing unwholesome food and drink, or to enter and inspect markets, buildings, etc., for the same purpose.'

In 1864 a lecture by Dr. Chevers, a high authority, 'On the preservation of the health of seamen,' drew attention to the adulteration of liquor sold in Bow Bazaar, Lal Bazaar, Radha Bazaar, and elsewhere, and the bad and unwholesome food provided in cheap eating-houses. The question of food inspection was then brought up before the Justices by the Sanitary Commission.

The Health Officer stated that he had already made 'some important seizures of salted pork, beef, beer, and other provisions,' and that with an adequate staff he could carry out the measures necessary for the protection of European sailors.

In the course of the year (1864) the Justices appointed a special staff, under the orders of the Health Officer, to enable him to check the sale of articles of food and drink unfit for human consumption.

With the lapse of time the importance of this work has been ever more clearly grasped, and some real control, although even yet not sufficiently effective, is now exercised by the Food Inspection branch.

Milk Supply.—In 1872 the Health Officer complained that the milkmen 'are an intolerable nuisance to the public, and the evils perpetrated by them mar, in no small degree, the health of the population of the northern part of the town. Adulteration of milk is an inherent practice with them, and their houses and cattle-sheds are hotbeds of filthiness.'

The problem presents great difficulties, and even in model Glasgow, where the milk inspectors are empowered to inspect byres or cowsheds outside the city limits, if the milk produced in them is being sent for sale within the city, the Lord Provost looks forward to the day when the milk supply of Glasgow will be municipalised—'a supply of pure milk being as essential to the population of a great city, and particularly to the children, as pure water.' It is not to be wondered at that the Chairman of the Calcutta Corporation, in the Report for 1913-14, is compelled to state that the problem 'has not yet been effectively dealt with.'

In 1904, on a comprehensive report by the Health Officer, it was resolved that—(1) milk should under no circumstances be stored in the shed or room which housed the cattle, and that (2) milk markets should be strictly controlled, for which purpose (3) an additional inspector was appointed.

The results however were not encouraging, and a special committee was appointed in 1910 to suggest more effective remedies.

A model cowshed was erected at Bagh Bazaar, but all efforts to induce the conservative *gala* to avail himself of its conveniences proved unsuccessful, and the shed was finally leased to a Marwari at a monthly rental of Rs50, for use as a dairy farm, subject to the control of the Health Department.

The careful and exhaustive report of the Committee embodied several definite conclusions and recommendations, but the attempt to give effect to one proposal, viz., the levy of a prohibitive fee of Rs10 for the slaughter of prime cows, led to a strike of butchers, and it was considered advisable both to suspend the levy of the fee and to reopen the whole question of securing a pure and ample milk supply. In 1913-14 the Municipal Analyst and his assistants examined 242 samples of adulterated milk, with the following results:—

46 or 19 %	contained less than	10 %	of adulteration.
151 or 62·4 %	„ „ „	25 %	„
39 or 16·1 %	„ „ „	50 %	„
6 or 2·5 %	„ more „	50 %	„

The Health Officer states that the extraction of fat and the addition of cane sugar is becoming a common practice. Out of 105 samples examined bacteriologically for 'acid-fast' bacilli, only 3 gave positive results.

Other Food-Stuffs.—Ghee (or clarified butter) and mustard-oil are used freely in the preparation of food by the Indian population; both lend themselves to the process of adulteration, by the use of fat, *mohua* oil, ground-nut oil, and plantain-butter in the former case, and mineral-oil in the latter. In 1886-87 the Commissioners took steps, without however much practical

result, to check the sale of adulterated ghee, and Act III. of 1886 was passed to vest them with the necessary powers. Its main provisions were repeated with some slight modifications in Acts II. of 1888 and III. of 1899, but the phraseology of the sections is defective, inasmuch as adulteration *per se* is apparently not an offence, if the adulteration is declared; in other words, an unscrupulous vendor may safeguard himself by a notice that he sells 'adulterated ghee,' though his ignorant customers may be unable to read, or, if they can read, are probably careless of the risk to their health. It need hardly be stated that this anomaly is shortly to be removed by an amendment of the law.

This defect in the law does not however interfere with the Health Officer's power to seize any article of human food exposed for sale which is in his opinion unwholesome or unfit for human consumption. If the case comes before a court, it is of course advisable to fortify the opinion of the Health Officer by the evidence of the analyst. The following Table shows the work of the analyst in this direction in 1913-14, and the last column indicates some improvement in the quality of the principal food-stuffs since 1912 :—

Articles of Food.	Number of Samples analysed.	Number of Samples found adulterated.	Per cent. of Samples showing adulteration.	
			1913.	1912.
			per cent.	per cent.
Ghee	444	119	26·4	35·7
Sweetmeat (ghee)	331	143	43·2	42·2
Milk	593	242	40·8	45·3
Butter	62	4	6·4	31·7
Mustard-oil (including special samples)	206	60	...	...
Sago	15	11	73·3	98·7
Flour	21	...	...	...
Aerated water	25	...	Nitrites were present in almost all the samples. All found good. No alum found.	
Tea	11	...		
Bread (loaf)	25	...		
Arrowroot	2	...		
Other food-stuffs	3	...		

In 1906-7 an attempt was made to improve the insanitary conditions under which sweetmeats, which are universally consumed in large quantities by natives of India, are commonly exposed for sale. Deposited on uncovered metal plates placed on counters projecting over the street, they are exposed to all the dust, flies, and other impurities of an Eastern thoroughfare.

The bye-laws however, which were sanctioned by Government in 1908, have not been proof against the ingenious quibbles of the Indian lawyer.

The regulation of manufactories of aerated waters, so largely used by the native and European population of India, is also hampered by the fact that such places are legally neither 'factories,' as defined in the Factories Act, nor comprised within the category of offensive or dangerous trades, controlled under section 466 of the present Act.

Fish and Meat.—The problem of efficiently controlling the meat shops first seriously engaged the attention of the Health Officer in 1897-98. In 1901 an Inspector was appointed to check illicit slaughtering, and in 1902 the appointment of an additional inspector was sanctioned. In 1909-10 two more inspectors were appointed to inspect the meat from animals slaughtered at the abattoirs at Tengra and Sonadanga. The detection of illicit slaughtering is greatly facilitated by the practice of 'stamping' the carcasses at the municipal abattoirs; all unstamped meat is thus *prima facie* evidence of illicit slaughtering. The fish supply reaches Calcutta chiefly by the E.B.S. Railway; it is inspected at Sealdah Station by an officer, who also watches the milk, which enters the city by this route.

The general inspection of fish sold in the bazaars is one of the duties of the ordinary food inspectors, referred to in the general account of the Health Department (pp. 63-69).

(b) *Cowsheds.*—The purity of the milk supply is of course intimately associated with the sanitation of cowsheds. In 1872 the Cattle Plague Commission wrote a vivid description of the insanitary cowsheds of that

time ; it is difficult to decide which factor was most prejudicial to the purity of the milk supply—whether the low, dark hovel which housed alike the goala, his family and his cows, or the slimy green tank in which the community bathed, and from which they drew water for the immemorial oblations of milkmen, or whether the noisome pools of liquid manure, covered with a frothy scum of combustible gas, such that a flame spread over the pool when a lighted match was thrown on its surface. In 1877 some rules were framed for the regulation of cowsheds, but they practically remained a dead-letter until 1880, when an attempt was made to enforce them. Frequent prosecutions, though resulting in fines so nominal that it was found cheaper to pay a fine every half-year than to comply with the rules and take out a license, gradually brought about some improvement, but in 1883 the annual report described cattle-sheds of all kinds as ‘the most obtrusive nuisance in the town.’

The removal of cow-dung from the sheds imposed a heavy strain upon the Conservancy Department, no less than 108 carts being required for this purpose in 1883. In 1884 about 320 cowsheds out of a total of 547 were connected with the sewers, the pipes being frequently stopped by the goalas attempting to use them for the removal of their refuse, after diluting it with water.

- In 1882-83 the sum of Rs5000 was set aside by the Corporation for building model cowsheds, but the money does not appear to have been spent, though bullock-sheds were built by the Commissioners in Jorabagan and Kolabagan.

In 1908 the Corporation acquired about 2 bighas of land in Nandalal Bose Lane (Bagh Bazaar) and constructed a cowshed of approved pattern, with accommodation for 50 cows.

The results of this experiment have so far not been encouraging, and, as already stated, the cowshed has been leased temporarily at a low rent for a dairy farm.

The Corporation in 1905 laid down the following

principles for dealing with the thorny question of the goalas :—

- (1) To provide all cowsheds with a filtered-water supply.
- (2) To fill up insanitary tanks in their neighbourhood.
- (3) To build municipal model cowsheds, and to let them out to goalas, thus providing the goala community with object-lessons on the value of properly housing their cattle and of hygienic dairy methods.
- (4) To improve gradually the localities in which cowsheds are numerous.
- (5) Systematic sanitary inspection.
- (6) The enforcing of the municipal bye-laws.

Some improved bye-laws were introduced in 1908, and there is no doubt that the conditions under which the milk trade is carried on have in recent years been much improved.

(c) *Offensive and Dangerous Trades*.—The earliest statutory provision for the regulation of such trades is contained in sections 102, 103, and 104 of Act XIV. of 1856, which enacted that all such trades existing within the limits of the town should be registered, and that no such place of business should be *newly* established without a license from the Commissioners. The Commissioners, however, obtained no control over places of business which existed before the passing of the Act, although they were anxious to remove outside the town all manufacturing or places of business from which an offensive or unwholesome smell should arise, and to confine each class of such trades to particular localities.

In 1860 the Commissioners enforced the registration of 2236 places of business, but their control, except for the inspection provided for in the bye-laws, ceased after registration. Act VI. of 1863 empowered the Justices to stop the use of any premises for such trades on the expiry of a month's notice, and in 1864 this power was freely exercised by the Health Officer. Thus a colony of *chamars* or carriers, settled in Monohar Das Ka Bagicha (between Elliott Road and Park Street), several tanneries

in Komedan Bagan, Fenwick Bazaar, Hospital Lane, Nanku Jemador's Lane, and Nalpuker Lane, while some manufactories of neat's food oil, catgut, etc., and all the saltpetre refineries were at this time forced beyond the limits of the old town.

For many years little more was done in continuation of Dr. Tonnerre's policy, until at length the growing nuisance of the hide trade brought the matter again into prominence.

The policy of assigning a particular location for the prosecution of this trade has for several years been accepted.

In 1903 the Health Officer suggested that the hide godowns near Souai Bazaar should be removed and provided with accommodation near the Dock West Boundary Road, and subsequently the Port Commissioners provided sites for the big wholesale hide-dealers at Kidderpore. In 1910-11 the question of localising offensive trades in general was considered; certain areas were defined, in which some of these trades might be allowed, while it was decided that the rest should be removed outside Calcutta. In 1913-14 the whole question was again considered by a committee. An area has been prescribed for the location of tanneries, hide godowns, gut factories, and the like, and steps are being taken, in spite of much opposition from these trades, to force them into it. The removal of hackney carriage stables and cowsheds from residential areas is also kept in view, and a list of such 'prescribed areas' has been published under the Act.

(d) *Disposal of the Dead*.—Two modes of disposing of the dead prevail in India—cremation and burial.

Where there is a Parsi community, it brings with it the ancient rite of the fire-worshippers, who expose their dead in a prescribed manner to the attacks of birds of prey; in the environs of Calcutta will be found their Towers of Silence.

Cremation, it need not be said, is universally practised by orthodox Hindus; the custom of burial prevails amongst Christians and Muhammadans.

A brief account of the Calcutta burning-ghâts and

burial-grounds is necessary in a record of the municipal institutions of Calcutta.

Nimtola Burning-Ghât.—This cremation ground dates from the early twenties of the last century. The original site was a little to the south of the present ghât. It was surrounded on three sides by a strong wall 15 feet high, the path to the river being left partially open, in accordance with the religious usages of the Hindus. The space within the walls measured 160 by 90 feet. The ghât was improved in 1857 by the Commissioners at a cost of Rs6180, of which Rs2500 was contributed by Babu Ram Narain Dutt; additional conveniences for the moribund and their attendants were provided. The burning of corpses was, however, carried out often in the most perfunctory manner, the remains being cast into the Hughli; Government in 1864 drew attention to the matter, and the Justices appointed a committee to devise means for rendering the practice of cremation at the river-side as unobjectionable as possible. By the beginning of 1866 the sum of Rs35,000 was, through the influence and public spirit of Babu Ram Gopal Ghost, raised by public subscriptions and placed at the disposal of the Chairman of the Justices.

The ghât was considerably enlarged and enclosed by a new wall on the river side, while new quarters for the *domes* were built within the enclosure; special incinerators devised by the Engineer proved unsatisfactory, and were dismantled in 1868. In 1875 the Commissioners for the Port of Calcutta complained that the ghât obstructed traffic, and was besides unsightly in appearance, and in 1876 a new ghât was completed on the present site by Messrs Mackintosh, Burn and Co., at a cost of Rs30,000, of which Rs25,000 were contributed by the Port Commissioners and the balance by the Justices. The ghât has since been improved on various occasions, at a total cost of about Rs17,000.¹ The institution now covers an area of 1 bigha, comprises three waiting-rooms, and is provided with a proper water supply and other conveni-

¹ 1891-92, Rs4582; 1892-93, Rs1894; 1894-95, Rs1700; 1905-6, Rs5144; 1912-13, Rs2379; 1913-14, Rs2079.

ences. The ghât remains open night and day, and the staff consists of two sub-registrars with medical qualifications, three peons, two mehtars, and two other menials, who with the mehtars assist at the neighbouring Kasi Mitter Ghât. A boat is kept for the removal of ashes from the two ghâts to the lower reaches of the Hughli. Contractors supply fuel and other necessary articles at Nimtola, at rates fixed by the Corporation; the cost of cremating the body of an adult amounts to Rs3.2.9, the cost for the body of a child being Rs1.11.6. For paupers, the corresponding charges are Rs1.9.6 and Rs0.13.6, and are paid by the Corporation, on the certificate of the police. A building for the accommodation of the moribund, who are brought down to die within sight of the river, was constructed south of the ghât, with funds contributed by Babu Girish Chandra Bose, a timber merchant of Darmahatta Street. The sub-registrars are in charge of the death-registers. In 1913-14, 10,344 bodies were cremated at this ghât.

Kasi Mitter Burning-Ghât.—This ghât in point of age appears to be a more venerable institution than the better-known ghât already described.

Kasinath Mitter was a nephew of Raja Rajballav, Naib of Dacca, said to have been killed in a general massacre in 1761. In 1774 there was a building adjacent to the ghât that bears Kasi Mitter's name, in which a Siva idol was housed; and in 1864 we learn that the estate of the idol had been neglected, but that the place had long been used as a burning-ghât. The Lottery Committee's proceedings of 1820 mention the cremation of bodies on this site in 1815. The ghât covers an area of only 3 kothas, and is situated to the north of Nimtola; it was once used by wealthy Hindus of position and influence, but is now resorted to by the poorer classes. In 1882-83 a house for the moribund was built here at the cost of Babu Akhoy Ch. Guha. Fuel, etc., is supplied by a dealer at scheduled rates, although he has entered into no contract with the Corporation. In 1913-14, 4716 bodies were cremated at this ghât, at which two sub-registrars are posted.

Shahnagore Burning-Ghât.—This ghât originally belonged to one Gopinath Chakravarti, who obtained a lease of the site from Government in 1860. He had the monopoly of the sale of fuel, etc., required for cremations, and also officiated as priest at the funeral ceremonies. Some years later the Hindu community made complaints to the Commissioners of the Suburban Municipality in respect of the inconvenience and extortion to which they were exposed ; in 1872 Gopinath was induced to surrender his lease, and the ghât was acquired by the Suburban Municipality. Gopinath and his sons were given the right to sell fuel and other articles required for cremations, on the understanding that he was to exercise no monopoly ; his family also continued to act as priests at the funeral ceremonies. The prices to be charged for fuel, etc., and the priest's fee were fixed by the Municipality.

In 1889, on the amalgamation of town and suburbs, the ghât vested in the Calcutta Corporation, who hold the site rent-free from Government. The agreement made with Gopinath in 1872 still holds good.

In 1889 one Abinash Ch. Chakravarti brought a suit against Gopinath's sons and the Corporation for a declaration of his hereditary right to supply fuel and to act as priest at Shahnagore Ghât to the exclusion of all other persons. It was held that he had the exclusive right to perform the priestly offices over bodies brought from the western side of Tolly's Nullah, but that he could only sell firewood at the ghât on the license of the Corporation. Gopinath's sons and Abinash now supply fuel and other necessary articles at rates fixed by the Corporation.

There were 3546 cremations at this ghât in 1913-14 ; a sub-registrar with some medical qualifications is in charge.

In 1913-14 the establishment and maintenance (including petty improvements) of the three burning-ghâts cost the Corporation Rs9095.

Crematorium.—This building was erected by the Corporation in 1903, on the suggestion of the Cremation Society of Bengal, at a cost of Rs34,000. It is situated to the east of the Circular Road cemetery.

The furnace, which is on the design patented by Toisoul, Fradst and Co., Paris, is heated by gas supplied at a high

pressure, and has eighteen large Bunsen burners. Owing to the intense heat of the furnace—about 1800° Fahr.—the consumption of smoke and gases from the incineration is complete and thorough. The amount of gas required for each cremation is about 4500 cubic feet, costing Rs3.8 per 1000 cubic feet. The fee charged was Rs30, including the cost of an urn for preserving the ashes, while Rs10 is charged per square yard of space in the grounds of the crematorium, and Rs32 for the erection of a monument not exceeding 2 feet by 2 feet. The number of cremations is extremely small, and in order to extend the usefulness of the institution, the cremation fees were recently abolished. In 1913-14, however, only four cremations took place.¹

The cost of establishment, maintenance, etc., in 1913-14 amounted to Rs772.

Burial-Grounds.—At the time of the Fever Hospital Committee we find complaints of the nuisance caused by the Muhammadan Kasiabaan burial-ground, which occupied the land on either side of Woodburn Park Road. The site was granted by the Company in exchange for a portion of the land upon which Fort William was built.

This burial-ground, nearly 40 bighas in extent, was closed in 1859, and a new site, 13 bighas 7 kothas in area, was provided by the Corporation at Tiljola, at a cost of Rs4272. There were also two other principal burial-grounds, one at Manicktollah, on the eastern side of Circular Road, which was particularly overcrowded and insanitary, and another at Ekbalpore.

The Act of 1876 prohibited further burials being ordinarily made within the town, and the crowded and neglected condition of the numerous private, public, and semi-public graveyards in the suburbs of Calcutta soon forced itself upon the attention of Government.

In 1879 a Committee of the Suburban Commissioners reported on the state of the existing Muhammadan cemeteries, and made proposals for the future needs of Calcutta and the suburbs.

The number of Muhammadan interments was taken as

¹ This crematorium is intended mainly for the use of Europeans, Anglo-Indians, and Indians, who have adopted a European style of living.

8600 annually, and it was proposed to acquire 131 bighas of land to extend the existing cemeteries, at a cost of Rs1,45,228. The matter, however, appears to have been in abeyance for several years, though the insanitary conditions caused by the crowded and neglected burial-grounds were disgraceful in the extreme.

In December 1887 Government appointed a Committee, under the presidency of Sir Henry Harrison, to consider the whole subject of Muhammadan interments; their report of the 6th November 1888 gives an interesting account of the burial-grounds of Calcutta, and recommended that legislation should be undertaken, empowering Government to appoint a Muhammadan Burial Board on a footing somewhat similar to that of the Christian Burial Board, which had been in existence for some time. The Muhammadan Burial Board Act IV. of 1889 was subsequently passed.

At this time there were 98 properties or premises in the suburbs shown as cemeteries, of which 72 were said to be in use; only 28 were registered, entitling them to be used without special permission.

Thirty of these cemeteries were described as public, and of these 12 were regular public burial-grounds in full use, in which 7502 interments (out of a total of about 8000) took place in 1887. From the careful survey made by the Committee of all burial-grounds, it appeared that these 12 cemeteries covered an extent of about 74 bighas, and in the opinion of the Committee it was necessary to provide an additional 25 or 30 bighas of unused ground. In 1894 the Corporation contributed Rs28,000 to the new Burial Board for the acquisition of 20 bighas of land in Tiljola in Gobra Goriston Road. This plot was formally opened as a new cemetery in July 1897, and the overcrowded New Kasia Bagan, Talbagan, Khoyrati, and Gobra cemeteries were at the same time closed. About two years later 25 bighas were added to the new burial-ground, and shortly afterwards a further addition of 28 bighas, known as the Extension Cemetery, was made. Later on, in 1910, another 60 bighas of land¹ were acquired

¹ At No. 1 Rai Charan Pal Lane, Tiljola.

for burial purposes and designated the Tiljola Burial-Ground.

The question of enlarging the old Manicktollah cemetery had remained in abeyance, but in 1907 a small plot of land was acquired at Bagmari, about a mile from the old cemetery, and in 1909 a further area of 123 bighas—making 150 bighas in all—was acquired.

It is calculated that this area will provide permanently for the needs of the Muhammadans who ordinarily use this cemetery, as it is possible to make new interments in land already used after the lapse of ten years. In 1911 the four old burial-grounds of Manicktollah were closed. Thus in the space of about fifteen years the Corporation, advised and helped by the Muhammadan Burial Board, closed eight much frequented but insanitary burial-grounds, with a total area of about 40 bighas, and opened new cemeteries with an area of 280 bighas. These new cemeteries are fenced in and kept in proper order, suitable accommodation being provided for the staff.

The old Solohana burial-ground at Ekbalpore (Kidderpore) is 18 bighas in area, and has remained unaltered; about twelve small burial-grounds, of which the largest (30 bighas in area) belongs to the Nakhoda sect, are maintained for small Muhammadan communities, such as the Shiahhs, Khojas, etc., and require no detailed description.

It is unnecessary to refer to the European cemeteries.

The interment of their dead is also customary with certain low-class Hindus, for whose use the Topsia and Muraripuker Hindu burial-grounds are maintained, under the control and management of a Hindu Burial Board. The expenditure in 1913-14 for establishment and maintenance of the burial-grounds (including Rs2546 for new works paid from income) was Rs11,480; the receipts from burial fees amounted to Rs12,707.

2. MEDICAL

(a) *Hospitals*.—The earliest hospital of which we hear in Calcutta was the *Police or Pauper Hospital*, which was certainly in existence in 1789. It was intended as an asylum and refuge for the miserably destitute

—the homeless native poor picked up off the streets by the police of Calcutta. In 1791 it was located in a rented building in the outskirts of the town, and had accommodation for 30 or 40 patients. The cost of establishment was Rs32 per month, and of diet and medicine Rs120 a month, the whole amount being defrayed by Government as a part of the Police charges. From 1802 the Police Surgeon was in general charge of the institution, being granted an allowance of Rs100 a month. In 1821-22 a building designed to hold 60 to 70 beds was erected by Government to the east of the gowkhana in Circular Road, at a cost of about Rs4000. In 1835 the hospital was removed to Kolutola, and in the following year Dr. Bain was appointed surgeon, on a pay of Rs300 per month. In 1837 the number of admissions was 1903, and the cost of establishment, diet, clothing, medicines, etc., was Co.'s Rs12,844. In 1840 the hospital was capable of receiving 140 patients, and was used by 'every description of poor—Europeans, natives, males and females, of all persuasions, castes, and countries, without distinction.' Both surgical and medical cases were admitted, only lepers and persons afflicted with diseases of the eye being excluded.

Police Hospital transferred to Justices.—Up till 1863 the hospital was under the supervision and control of the Commissioner of Police, and its entire cost was borne by Government. As the institution expanded it became impossible for the Commissioner to exercise any detailed control over its management, and Sir Stuart Hogg, who combined in himself the offices of Chairman of the Justices and Commissioner of Police, proposed that the hospital should be transferred to the Medical Department of Government. Government however proposed that the hospital should be supported and managed by the Justices, who agreed to undertake this responsibility on condition that a suitable building was placed at their disposal. About this time it was decided to impose the cost of the town police on the Justices, and in consenting to a portion of these charges being borne by the Local Government, the Government of India stipulated

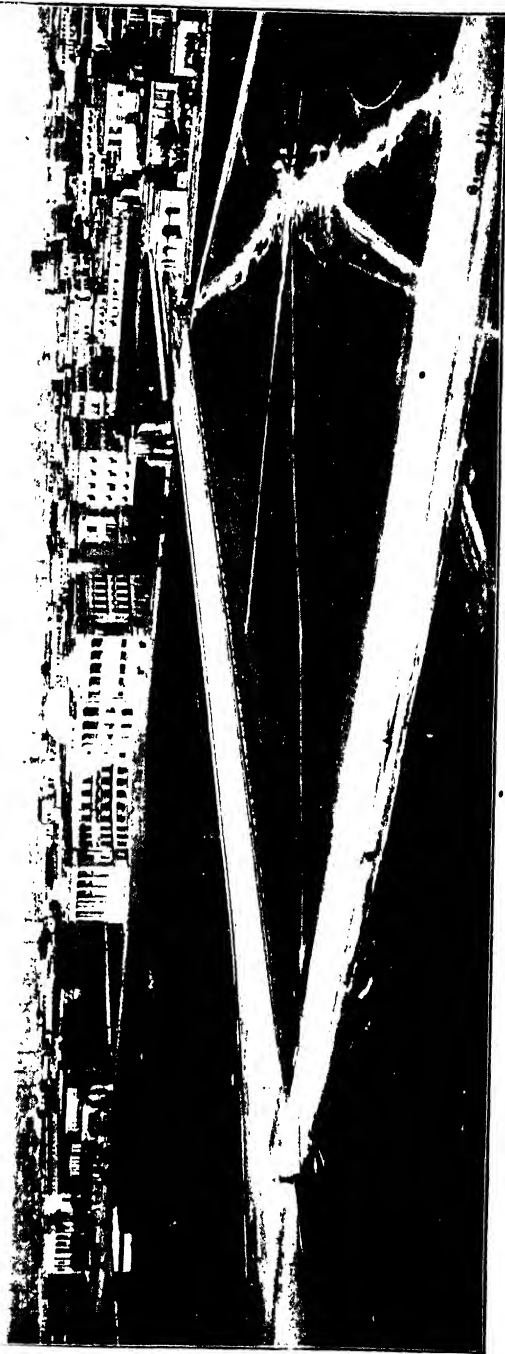


Photo by Bourne & Shepherd, Calcutta

THE HOWRAH BRIDGE, CALCUTTA, INDIA. PHOTOGRAPHED BY BOURNE & SHEPHERD.

that the Municipality should defray all expenses connected with the Pauper Hospital, by which title the institution began at this time to be known. Act XI. of 1867 was passed to enable the Justices to levy a Police Rate and to apply municipal funds for the support of one or more Pauper Hospitals.

The group of buildings now forming the Campbell Medical School and Hospital had been originally constructed by Government from the proceeds of the income tax of the suburbs, and had been made over in 1865 to the Suburban Municipality for use as a municipal market. This project was however soon abandoned, and the buildings, altered and adapted at a cost of about Rs20,000, were made over to the Justices in 1867 for the purposes of the Pauper Hospital.

The institution remained under the control of the Justices for nearly six years. The expenditure however had a constant tendency to grow, and the dual control of the Municipal Hospital Committee and the Deputy Inspector-General of Civil Hospitals led to friction, when the former body attempted to curtail the expenditure which the latter considered necessary.

In 1873 Government was anxious to transfer the vernacular medical classes of the Medical College to the Pauper Hospital; the instructors and the students were however to remain under the control of the Medical College Council, and the Justices, apprehending that the further multiplication of authorities must lead to increased friction, resolved that 'the entire management of the Pauper Hospital be transferred to Government, the Justices agreeing to pay towards its support an annual contribution of Rs30,000, on the understanding that the number of beds now maintained, viz. 300, be not curtailed, and that the institution be continued on its present footing as a Lazar House and Pauper Hospital for the reception of all moribund cases and patients of the most destitute classes.'

This proposal was approved by Government, which assumed charge of the hospital on the 1st December 1873, in 1874 the institution was named 'The Campbell Medical School and College,' after Sir George Campbell, Lieutenant-Governor of Bengal.

In 1894 the annual Corporation contribution was raised to Rs35,000 ; since 1909 the Corporation has given an annual grant of Rs41,000. In 1901 it was decided to admit European and Eurasian small-pox patients to this hospital, while more recently it has developed into an institution, reserved almost entirely for the treatment of the destitute, of small-pox and other infectious cases.

The circumstances which led to the admission of small-pox patients may be briefly stated.

Accommodation for Small-pox Cases.—In 1864 the Sanitary Commission proposed that the Justices should provide the Police with *dhoolies* for the purpose of removing sick and destitute persons to hospital, and although the Act of 1863 was silent on the subject of the Municipality providing medical relief for the poor, the small-pox epidemic of 1864-65 induced the Justices to ignore their Act and to provide the conveyances, which Government declared it was their duty to provide. Government had established a temporary small-pox hospital at Chitpore, but in 1865 the Government of India laid down the principle that it was undesirable for the State to accept the entire responsibility of providing hospital accommodation for the public of Calcutta, and suggested that the local needs in this direction should properly be supplied from private benefactions and by grants from local bodies. The Justices had a few months previously agreed to pay from municipal funds the entire expenses already incurred for the hospital in Chitpore, and to make their own arrangements for a permanent small-pox hospital, for which the Local Government was to provide a qualified medical officer ; but in view of their financial difficulties, and in the absence of statutory authority, they declined to accept the suggestion that the Municipality should incur the responsibility of providing hospitals for the native population of Calcutta, and, apparently alarmed by the views of the Government of India, they withdrew their former offer to provide a permanent small-pox hospital. In 1867, however, the Justices agreed to maintain a small-pox hospital outside the old town, on condition that a suitable building should be provided by

Government, and that the Police Surgeon should supervise its working as a part of his duties.

Eventually a building was constructed to the east of the Pauper Hospital, and placed in charge of the Superintendent of that institution; from that time the small-pox hospital has been an annexe of the Campbell Hospital, although on the occasion of severe epidemics it has proved necessary to provide additional temporary accommodation outside the town.

Sambhu Nath Pandit Hospital.—In 1840 Government established a charitable dispensary at Bhowanipore, under the name of 'Bhowanipore Dispensary,' and maintained it until 1871. On the death in 1867 of the Hon. Babu Sambhu Nath Pandit, the first Indian Judge of the High Court of Bengal, a committee was formed to found a memorial in his honour. Over Rs25,000 was subscribed by the public, and after meeting the cost of a portrait, the committee decided in 1871 to make over the balance, Rs21,445, to the Bhowanipore Dispensary Committee, in order that the dispensary might be enlarged to perpetuate the memory of the late Judge. An endowment was created, and it was decided to construct a new building on another site (No. 108 Russa Road) measuring about 9 kothas, which was acquired at a cost of Rs8792; the building, which was constructed in 1877, cost Rs6853, and the balance, Rs5800, was invested in Government securities, for the benefit of the dispensary, in which only outdoor patients were treated. In 1880 the dispensary was transferred to the Suburban Commissioners, who maintained it at an average cost of Rs2060 a year, until the amalgamation of town and suburbs in 1889, when the dispensary vested in the Corporation of Calcutta.

In 1890 the Corporation assumed the direct and entire management of the institution. In 1893 Government appointed a committee to advise upon the medical needs of Calcutta, and the want of a well-equipped hospital for the suburbs was clearly demonstrated. Government then made proposals in the matter to the Corporation, and it was finally arranged that the old dispensary should be closed, that the Corporation should provide a new site

about 129 kothas in area, being a portion of the plot acquired for the Bhowanipore Pumping-Station, and valued at Rs64,000, that Government should thereon construct and maintain a new hospital and dispensary, that the Corporation should be represented on the managing committee, and should make an annual grant of Rs5000.

The new building was completed in 1896, and was originally known as the South Suburban Hospital; in 1898, in consideration of the Corporation making over an additional plot of land valued at Rs16,000, the name was changed to Sambhu Nath Pandit Hospital.

In 1905 a friendly suit was instituted in the Court of the District Judge of Alipore, to determine the status and rights of the Corporation in regard to the original trust; in accordance with the decision of the Court, the original premises, No. 108 Russa Road, were sold by public auction in 1905, and the sale proceeds, Rs18,000, along with the securities in which the surplus funds had been invested in 1877, were made over to Government in discharge of the trust.

Kidderpore Dispensary.—This outdoor dispensary was established in 1892, on the advice of the Suburban Improvement Committee, to meet the needs of the large floating population in this area, which is distinguished by having the highest death-rate in the town.¹

The annual cost of maintenance was originally about Rs2000; it has since risen to about Rs3500. The average number of patients treated in the first years of the institution was about 5000, but in 1910 the number of cases (new and old) had risen to about 18,000. The dispensary has however recently fallen on evil days, and in 1913-14 the number of new cases was only 5834, as against 6056 in 1912, while the fall in the number of old cases was even more marked.

The appointment of a new Medical Officer, however, in 1914, immediately led to a striking improvement, and the number of patients in 1914-15 was 9302.

Proposals are now under consideration for carrying

¹ 42·6 per mille in 1913-14.

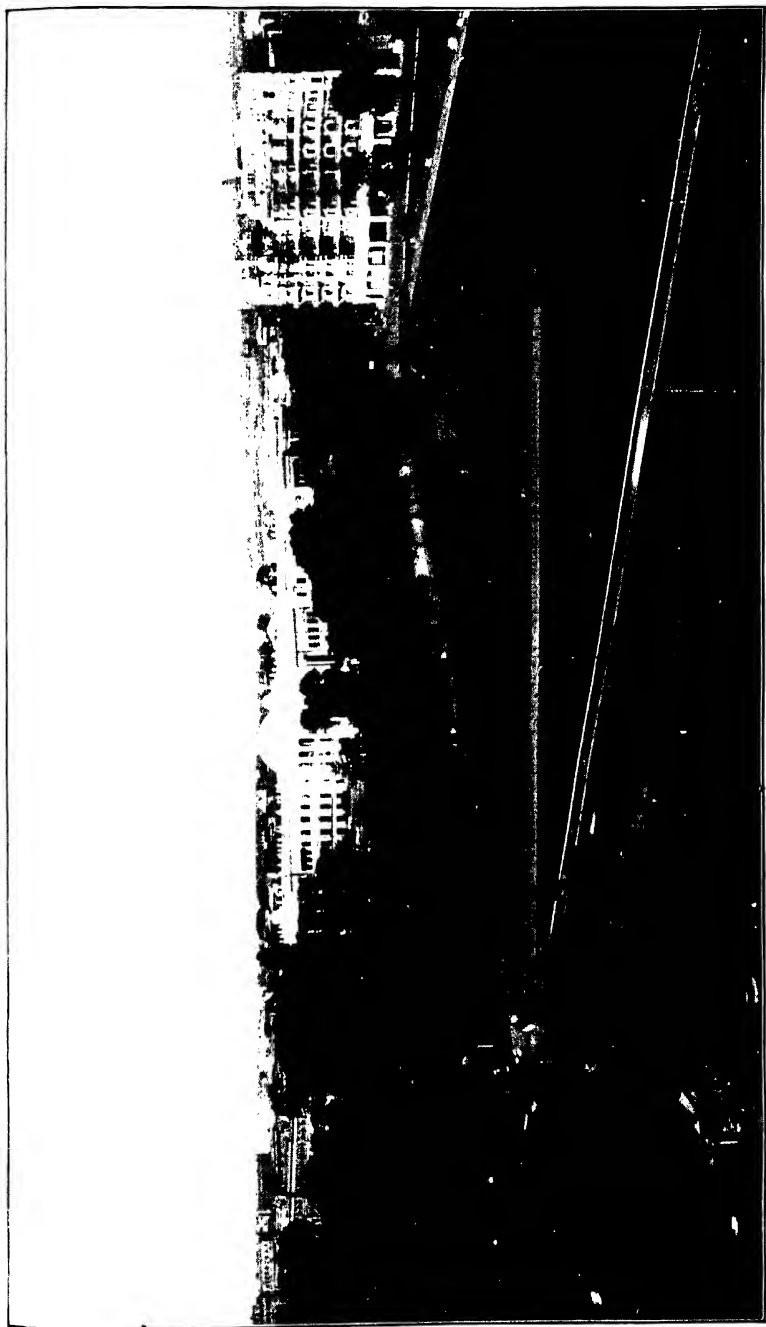


Photo by Bourne & Shepherd, Calcutta

out large structural alterations in the building¹ and for converting it into a thoroughly efficient and well-equipped institution.

Pulta Dispensary.—Another dispensary is maintained at Pulta, intended solely for the employees at the Water-works. The number of cases treated in 1913-14 was 3796.

General.—It will be evident from the preceding sketch that the Corporation of Calcutta, as compared with western municipalities of corresponding resources, has done little to assist in the foundation and endowment of hospitals for the treatment of its citizens. Calcutta happily possesses hospitals which may challenge comparison with the splendid foundations of the West, but it is beyond the scope of this hand-book to describe institutions, in the development or control of which the Municipality can claim no direct share. Until 1867 the Justices had no statutory power to apply municipal funds for the construction and maintenance of hospitals, and for many years subsequently their resources were strained to the uttermost in providing for the drainage, water supply, roads, and other primary needs of a city; their contributions, however, for the maintenance of Calcutta's principal hospitals and similar charitable institutions have in recent years been steadily increased. In 1913-14 grants amounting to Rs94,461 were paid for the support of hospitals and dispensaries, and grants amounting to Rs41,086 to almshouses, in the management of which the Corporation exercises no control.

Proposals for the establishment of a Tuberculin Dispensary are under consideration, and a much-needed dispensary for pilgrims at Kalighat is being constructed by the Municipality with funds (Rs20,000) placed at its disposal by Rai Hariram Goenka Bahadur, a Municipal Commissioner.

(b) *Vaccination.*—Inoculation against small-pox was first introduced into Calcutta in 1803,² and the method

¹ A design and estimate amounting to Rs77,000 for a proper building with quarters for the Medical Officer received sanction in 1914-15,

² The account given in Dr. M'Leod's report on vaccination in Calcutta (1880-81) is closely followed in this sketch.

adopted to ensure the use of a potent strain of lymph was ingenious.

The virus was conveyed from Madras by a series of vaccinations performed on a succession of susceptible subjects in the ship 'Hunter.' Measures were promptly taken to establish the vesicle in Calcutta and the principal stations in Bengal, but the steps taken to popularise vaccination were at once checked by the determined opposition of the native inoculators, who in spite of official prohibition continued to practise their dangerous art, and by the stubborn conservatism of the people.

In 1848-50 and 1856-58 Calcutta was visited by severe epidemics of small-pox, but vaccination was still rejected by a large section of the community; the epidemics of 1863-65 however at last arrested public attention, and led to the prohibition of inoculation by law (Act IV. of 1865) and the adoption of a domiciliary system of vaccination in and around Calcutta. The vaccine establishment was remodelled and strengthened, and gangs of vaccinators under the immediate command of a head vaccinator, and the general control of assistant surgeons, visited periodically all parts of the town and its approaches, and vaccinated all who voluntarily submitted to the process. It must be assumed that progress was made, for no new epidemic of any magnitude occurred until 1879, and the outbreak of that year is itself classed as a 'third-rate epidemic.'

Vaccination made Compulsory.—In 1879 the Commissioners considered two memoranda prepared by Dr. Charles and Dr. Payne, and took the great step of accepting a proposal to provide by legislation for compulsory vaccination; the Bengal Vaccination Act (V. of 1880) came into force from the 9th June 1880. This Act transferred the responsibility for making adequate arrangements in this matter from Government to the Municipality, and appointed the Health Officer *ex officio* superintendent for the town. The legal responsibility for having their children vaccinated was thrown upon parents and guardians, and it was no longer the duty of

vaccinators to search for unprotected children in their houses. Eight vaccine stations were at once selected, mostly located in hospitals, and preliminary arrangements for instructing the staff and for the distribution of notices were completed by the 1st October.

The Health Officer's new establishment consisted of a deputy superintendent, three head vaccinators and eleven vaccinators, and its yearly cost was Rs3753.

It is of interest to note that Babu Ganga Narayan Acharjya, who had been one of the vaccination staff in 1803, died at this time after seventy-six years of service. The new Act enabled progress to be made, but in 1884 Dr. Birch, at a special meeting of the Commissioners, expressed the opinion that the results had been far from satisfactory, and a warm debate, protracted over two sittings, was followed by the appointment of a special committee to consider and report on the matter. Their recommendations led to some amendments in the Act and some strengthening of the staff.

In 1896 we find that there were 14 stations in the town where persons were on stated days vaccinated free of charge, while home vaccination was performed at a charge of 4 annas per head, plus the cost—not exceeding 2 rupees—of conveying a calf to the site.

In 1895 nearly 55,000 persons were vaccinated by the Health Department, while the mortality from an epidemic of small-pox in that year was 2220. On the reorganisation of 1901, the deputy superintendent's post and the four inspectorships of vaccination were abolished, and the District Health Officers were placed in charge of the department in their own districts; fifteen hospital assistants were appointed as vaccinators.

In 1903 the District Health Officers were appointed as Deputy Superintendents of Vaccination under the Health Officer, the *ex officio* Superintendent, seven inspectors on pay graded Rs60-75 per mensem were appointed, and the number of vaccinators increased to twenty-four, the pay being fixed at Rs20-30 a month; the two posts of female vaccinators were continued.

Procedure.—The main features of the Vaccination Act

1880, as modified up to date, and the procedure of the vaccination branch, are briefly as follows :—

- (1) Vaccination is compulsory in the case of all children born in Calcutta within six months of their birth, of all unprotected children under fourteen years of age brought to reside in Calcutta within six months of their arrival, and finally in the case of all unprotected persons if the Health Officer requires it.
- (2) Responsibility for having their children or wards vaccinated rests on parents or guardians.
- (3) The Health Officer of the Port may require all unprotected persons arriving in the port to be vaccinated.

Prosecutions are instituted only against recalcitrant persons.

The public vaccinators are bound to vaccinate free of charge all persons presenting themselves at any of the 17 public stations ; elsewhere a fee of 4 annas is charged for each vaccination.

In 1913-14, 30,740 persons were vaccinated ; there were 120 deaths, *i.e.* 13 per mille of population ; 180 prosecutions were instituted.

Vaccine Depot.—In 1901 the Corporation decided to establish a depot for the preparation of glycerinated lymph ; the depot was constructed on a site in Ballygurge Circular Road, but was not in actual working order until 1905. The difficulty of obtaining a sufficient stock of good lymph throughout the year was surmounted by means of cold storage. The daily supply is drawn from stock each morning and put in capillary tubes, which can be filled at the rate of 400 per hour. The tubes are rapidly distributed to each district, a reserve of 1000 to 2000 tubes, sufficient for 4000 to 8000 vaccinations, being always maintained. The vaccine is believed to be superior in quality to that obtained from the Lister Institute. About 25,000 capillary tubes of vaccine are used each year ; the receipts from the sale of lymph to private practitioners amounted in 1913-14 to Rs615.

At present the Corporation has no cold storage of its own, and large tubes of lymph are kept at the Medical College Laboratory.

The following gives vaccination statistics ; the apparently capricious variations are due to the prevalence or freedom from a small-pox epidemic.

NUMBER OF VACCINATIONS

Year.	Total Number.		Successful.	
	Primary.	Re-vaccinations.	Primary.	Re-vaccinations.
1876	6,086		.....	.....
1880 ¹	5,349	1,398	5,099	.....
1885	12,157	1,718	11,664	149
1890	16,131	11,043	14,207	2,252
1895	15,184	39,798	13,506	4,080
1900	15,210	12,164	14,102	4,616
1905	19,701	7,053	17,824	3,706
1910	20,561	3,698	19,766	1,122
1915	27,815	51,429	99·8 per cent.	46·0 per cent.

¹ The Vaccination Act came into force in this year.

N.B.—An account of the Disinfecting Station, inadvertently omitted from the text, will be found in Appendix IV.

CHAPTER VII

(a) ROADS

Evolution of the Calcutta Road System, 1760-1836.—It has already been stated that the activities of the civic authorities from the early days of Calcutta up to the middle of the nineteenth century were directed mainly to the construction, maintenance, and cleansing of roads. We have also seen that in the latter half of the century the expanding resources of the municipality were severely strained by the execution of costly schemes of drainage and water supply—bare necessities, which insistently haunted the thoughts of the early administrators of the town. The need for large schemes of street improvement was not less real and hardly less urgent, nor was Calcutta wanting in men of far and ardent vision to press that need upon its unwilling attention. But even in the West the problem was grappled with far too late, and it is no matter for surprise that in Calcutta the supreme effort which Lieutenant Abercrombie's town-planning scheme demanded was not forthcoming. Sporadic improvements were made, but the disjointed, irregular pattern which the growing town had taken on was not undone and re-woven according to a plan.

It will be convenient to trace the growth of the street system in its broader aspect, before describing the measures taken to improve the road administration.

'In 1760 there were few good roads in Calcutta; the *Kutchi* road that ran to Baraset was the favourite walk of the populace.'¹ In 1762 some new roads were constructed, and an establishment organised for maintaining them in order. Funds however were small, and it was found too expensive to face off even the drains

¹ A. K. Ray's *Short History of Calcutta*, p. 68.

with bricks. In June 1766 the first road surveyor was appointed, but little progress was made in improving the roads.

In 1799 the new Justices took in hand the important work of metalling Circular Road, and a new era was introduced by Lord Wellesley's celebrated Minute of 1803. His street policy is contained in the following words :—' In those quarters of the town occupied principally by the native inhabitants, the houses have been built without order or regularity, and the streets and lanes have been formed without attention to the health, convenience or safety of the inhabitants. . . . It is a primary duty of Government to provide for the health, safety and convenience of the inhabitants of this great town, by establishing a comprehensive system for the improvement of the roads, streets . . . and by fixing permanent rules for the construction and distribution of the houses and public edifices. . . .

' The appearance and beauty of the town are inseparably connected with the health, safety and convenience of the inhabitants, and every improvement which shall introduce a greater degree of order, symmetry and magnificence in the streets, roads . . . will tend to ameliorate the climate and to promote and secure every object of a just and salutary system of Police.'

He followed up the exposition of his policy by appointing a Town Improvement Committee, to prepare for the consideration of Government a complete street scheme for the city, pivoting upon the new Circular Road, on which we are told by one of the writers of the day, ' the young, the sprightly and the opulent during the fragrance of morning, in the chariots of health enjoy the gales of recreation.'

The scheme, however, prepared by the Committee after careful inquiry, although sanctioned by Government and intended to be carried out from Government funds, was unfortunately only partially executed. In 1805 Government gave its official recognition to the Lottery Commissioners, who placed funds at the disposal of the Improvement Committee ; between 1817

and 1836 the famous Lottery Committee discharged with conspicuous success the duties which Lord Wellesley's original committee and its successor of 1809 had relinquished. By 1836 the following streets had been opened up :—Elliott Road, Strand Road (Prinsep Ghât to Hatkhola), Wood Street, Wellesley Street, Wellington Street, College Street, Cornwallis Street, Hastings Street, Moira Street, Loudon Street; Amherst Street, and Hare Street, while Free School Street, Kyd Street, Mangoe Lane, and Bentinck Street had been widened and straightened.¹ In 1836 Lord Auckland appointed the Fever Hospital and Municipal Enquiry Committee, to whose monumental report reference has been so frequently made in these pages. Its wide survey embraced the bold scheme of street improvement, prepared by Lieutenant Abercrombie at its request to make good the deficiencies in the skeleton framework of communications, which the Lottery Funds had made possible.

His scheme included

- (1) The linking up of Loudon Street with Upper Circular Road via St. James Street and Amherst Street ;
- (2) The prolongation of Free School Street to the bridge over the Circular Canal next the river at Raja Raj Kissen Ghât ;
- (3) A straight road from the Chowringhee-Dhurrumtollah corner to the river near Bagh Bazaar, and a river-side road from Darmahatta Ghât to meet this new street at Chitpore Bridge ;
- (4) A road from the Sobhabazaar—Chitpore Road corner—to meet Upper Circular Road ;
- (5) A road from Tank, i.e. Dalhousie Square, to Sobhabazaar in a straight line nearly parallel with the new alignment of Chitpore Road (3) ;

¹ Up to 1817 about 7½ lakhs were spent on town improvements, and the balance in hand in 1817 amounted to 4½ lakhs. Between 1825 and 1836 the *gross* profits on the Lotteries were Rs10,19,349, of which nearly two-thirds would be available for town improvements. The gross profits between 1817 and 1825, plus the 4½ lakhs opening balance, could hardly have been less than 15 lakhs, and in all probably nearly 25 lakhs must have been spent on public works between 1805-1836.

- (6) A road continuing Manicktollah Street to the junction of No. 5 with Nimtola Ghât Street ; and
- (7) A road from the back of the Mint to a point near the present junction of Halliday Street and Machuabazaar Street.

Beadon Street, Grey Street, and Upper Strand Road were much belated fruits of the above scheme, while the other proposals were definitely abandoned in 1888-89, when it was estimated that they would cost nearly 1½ crores of rupees.

In 1886 we find Dr. Simpson, the Health Officer, advocating the adoption of Abercrombie's scheme in its entirety, but as a less costly measure urging the adoption of the following prudent and far-sighted proposal :— ' A model plan of the city, as it is intended to be laid out with reference to existing streets and future streets, both in town and suburbs, should be drawn, and kept constantly in sight by the Commissioners, and no houses that interfere with this plan should be allowed to be built. . . . Even for the older portion of the town such a plan is perfectly feasible.' In default of more heroic measures, it is certain that a comprehensive and judicious scheme of alignments, drawn up in 1886, would by this time of writing have produced a Calcutta infinitely superior to the present city, which has grown to its maturity without a plan.

• *Regulation by Statute 1847-1899.*—Act XVI. of 1847 first recognised the necessity of empowering the Commissioners to open out streets, and Act II. of 1848 contained a declaration by the Legislature on the importance of forming straight and spacious streets and breaking up narrow lanes and gullies. The latter Act was however repealed in 1852, and apart from the construction of Halliday Street, the principles laid down in these early enactments appear to have borne little fruit.

• Act XIV. of 1856, and the Acts of 1863 and 1876, contained provisions for improving the line of streets by setting buildings forward or back, while the Act of 1888 and the present Act (III. of 1899) empowered the

Commissioners to prepare and publish the alignment of *projected* streets, to which all building and rebuilding must conform.

Development of Street System after 1863.—Although the failure on the part of the Government or the Municipality of the last half of the nineteenth century to grasp the imperative need of developing the city according to some plan has had disastrous results, it is not suggested that important and beneficial street improvements were not effected during this period.

Between 1863 and 1880 nearly 14 lakhs were expended by the Municipality on the following works :—

(1) Continuation of Free School Street to Dhurrumtollah (1864)	Rs 40,000
(2) Canning Street (1865)	5,97,000
(3) Extension of Clive Row (1865)	2,59,000
(4) Beadon Street (1868)	5,28,000
While Beadon Square (1867) cost	2,73,000
(5) Grey Street (1873)	4,06,000

Of this expenditure of about 21 lakhs, over 7 lakhs was recouped by the sale of frontage lands, leaving the nett cost at about 14 lakhs. Government contributed Rs34,000 in 1861, Rs48,000 in 1862, and Rs1,00,000 in 1865 towards the cost of these works. Contributions in cash or more often in land were also made by private landlords. Thus in 1857 Cowar Ramchand contributed Rs40,000 towards the construction of Raja Woodmunt Street, and in 1885* the Nawab of Murshidabad contributed land for the construction of Nawab Lane; the latter's example was followed by Babu Brajabandhu Mallick in 1866, when Clive Row was extended, by the Maharani of Swarnamoyi in 1880 for the Ultadinghi Junction Road, and by Kumar (now Raja) Dinendranarayan for Ray Street in 1909-10.

Extensions since 1888.—The works undertaken in connection with the drainage and water-supply schemes resulted in the construction of the Suburban High-Level Sewer Road, and in the conversion of many open drains or ditches into narrow lanes.

In 1888 there were 181½ miles of road in the town, of

which 34½ were narrow lanes formed by sewerage and filling in open ditches. Act II. of 1888, which made an annual expenditure of Rs3 lakhs for suburban improvements obligatory on the Corporation, was responsible for the construction of several fine roads, which were driven at a comparatively small cost through neglected and insanitary areas.

The most important of such roads were :

(1) Lansdowne Road, costing	Rs3,28,000
(2) Harish Chandra Mukerji Road, costing	5,16,000
(3) Hazra Road, costing	1,82,000
(4) Chetla Central Road, costing	93,000
(5) Sterndale Road, costing	11,000
(6) Judge's Court and Gopalnagore Roads, costing	33,000
(7) Sabzibagan Road, costing	21,000
(8) Kali Temple Road, costing	42,000
(9) Hastings Park Road, costing	7,000
(10) Woodburn Park Road, costing	49,000
(11) Jagaunath Dutt and Gas St., costing	68,000
(12) Upper Circular Road—Gas St., costing	51,000
Total	<u>Rs14,01,000</u>

In some cases, some recoupment was subsequently obtained by the sale of surplus lands.

In 1902-3 some large road schemes were suspended by order of Government, in view of the decision to form a Calcutta Improvement Trust with large revenues of its own to carry out a comprehensive programme of street improvements, to reclaim insanitary and congested areas, and to provide for the rehousing of the displaced population. It was not however until 1912 that the Trust was formed ; in the meantime the Corporation, in connection with its Canal Area Drainage Scheme, had carried out a small town-planning scheme, involving the construction of nearly 5 miles of road.

Maintenance of Roads.—It was not until 1820 that a regular system for metalling the roads was introduced ; the annual cost of the new arrangements was about

Rs25,000. Metalling with stone appears to have been introduced about 1834 or 1835. When the Fever Hospital Committee sat in 1836, the aggregate length of the roads was placed at 170 miles, but this figure evidently included some suburban roads; the cost of repairs amounted to Rs40,000 or Rs50,000 a year. Pucca roads were constructed either of *khoa* (broken brick) or stone ballast. The brick was supplied by contractors, who were also responsible for its carriage or conveyance; the labour was partly departmental and partly by contract. There was a system of check on delivery of the stores at the municipal depots and on their issue by the sirkar or storekeeper, but the Committee was not satisfied that the check was complete and thorough. Between 1830 and 1836 the competition between the contractors was so keen that prices fell below the point at which an honest contractor could supply *khoa* at any profit. The result was short quantity and inferior quality. The municipal authorities replied by demanding the deposit of Government paper as security, and devised their check on the measurements and quality of *khoa*, whereupon the price rose from Rs9 to Rs13 per 100 ferra^hs,¹ and even at this price it became difficult to obtain good quality *khoa*. In 1848 the Improvement Commissioners issued very precise and stringent rules to guide the Superintendent of Roads in checking road repairs and preparing his bills for such repair and for new construction. The difficulties of road administration were however just beginning, and apart from that happy period between 1835 and 1850 when stone-ballast in sufficient quantities could be obtained for the asking, the problem of securing an adequate supply of good road metal has been a perennial one. The expenditure, too, on roads was growing. In 1853 it amounted to Rs1,01,751, and although it fell considerably below this figure for the next six years, we find the Commissioners much alarmed in 1860 by an expenditure of Rs1,35,456, which in 1861 had increased to Rs1,53,559.²

¹ One ferra^h=5 cubic feet.

² This amount, however, included the cost of opening up a new street.

The following Table shows the road expenditure between 1863 and 1875, in which year there were in the town proper 131½ miles of metalled road, 81½ miles being laid with stone and 50 miles with brick :—

Year.	Cost in round figures.
1863	Rs1,85,000
1864	6,27,000
1865	3,95,000
1866	3,97,000
1867	2,76,000
1868	3,24,000
1869	3,74,000
1870	3,53,000
1871	2,56,000
1872	2,77,000
1873	2,46,000
1874	3,03,000
1875	3,84,000

The expenditure on road repairs in 1913-14 was Rs8,65,000, and the length of roads was 290 miles.

In his Report for the year 1875, the Engineer points out that the wear and tear on the roads, and consequently the cost of maintenance, had been greatly increased by the growth of wheeled traffic, which, due partly to the normal expansion of trade, had also been influenced by special causes.

The jetties constructed by the Port Commissioners had attracted the bulk of the import and export traffic, which now passed through the streets instead of being borne by country boats along the canals and other waterways round Calcutta, while the opening of the Hughli Bridge turned on to the city streets the bulk of the railway and the local Howrah traffic, which had formerly been as far as possible water-borne.

In more recent years the great expansion of trade in Calcutta has severely tried the durability of road materials in the commercial quarter, and the Corporation has recently framed proposals for regulating the width of cart-tyres, as the narrow tyre of the ordinary country

cart subjects any road to an unfair test. More effective control is also desired over the action of private companies, such as gas and electric supply corporations, who require to tear up roads in laying or repairing their pipes and wires.

Improvement of Road Surface.—The Corporation has from time to time made elaborate experiments to discover a suitable material which might withstand the severe strain of cart traffic on the roads. An interesting attempt was made in 1862 to confine the heavy cart traffic in Strand Road to a double tramway of stone, with an ‘up’ and a ‘down’ track. It is not clear whether the stringent control of traffic required was found practicable; the maintenance or completion of the track was found too costly and the experiment was abandoned. In 1904-5 an improved method of mixing the blinding with the metal was adopted. In 1907-8 and 1909-10 unsuccessful experiments with asphalt macadam were made in Dalhousie Square East and College Street; the surface was satisfactory, but durability was small.

In 1910-11 experiments were made by Messrs. Bird and Co. with Indian patent stone slags on the Gladwell system, and with lithofalt, but the results were not encouraging. A modification of Gladwell’s tar macadam, devised by Mr. MacCabe, Chief Engineer, has however proved highly satisfactory; the initial cost is much greater than that of ordinary macadam, but the waterproof quality of this surface is with the Calcutta climate a great asset, as the life of the road is thereby much increased. In 1913-14 about 42,000 square yards of new tar-macadam road were laid at a cost of about Rs99,000. The problem of providing suitable roads for bullock-cart traffic is however still unsolved. The regulation of the width of tyres will no doubt have beneficial results, but experiments to discover a suitable surface are being made with (1) reinforced concrete, and (2) specially prepared wire-cut bricks laid on concrete.¹

The Corporation has also recently undertaken exten-

¹ Government had declined to sanction a large scheme costing Rs14½ lakhs for paving streets, where bullock-cart traffic is heavy, with stone setts.

sive experiments in wood-paving, in connection with which the Forest Department is supplying 50 tons of *sal* wood blocks free of cost; pine wood blocks are also being tried.

Road Metal Supply.—It has already been stated that about the middle of last century the municipal authorities met with increasing difficulty in obtaining an adequate supply of good road metal. About 1834 or 1835 a cheap supply of stone metal was discovered in the stone carried by ships arriving at Calcutta in ballast. Its cost to the Municipality did not much exceed the expense of landing and carting it, but the supply being limited and uncertain, its use was confined to those roads where traffic was heaviest. The supply of stone ballast, however, which had originally come chiefly from China and Mauritius, and subsequently from Bourbon, Bombay, and Australia, naturally decreased as the import trade with India expanded.

In 1858 the import of stone as ballast was about 12,000 tons less than in the preceding year; the demand, moreover, which in 1848 had been exceeded by the supply, was constantly growing, and whereas formerly the Municipality had obtained as much stone as it required for the mere cost of landing it (5 to 6 annas per ton), the anxiety of the Suburban Road Superintendent and private contractors to obtain stone had the effect in 1858 of attaching a price to the commodity itself.

A small portion of the stone was required for transports and other vessels returning from India in ballast, and the remainder was made over to the House of Correction, where it was broken up and sold to the Calcutta Municipality or to the Superintendent of Suburban Roads. In 1860 the Commissioners refer to Government having raised the price of stone supplied by the House of Correction from Rs21 to Rs32.4 per 100 ferrahts, and as the ballast itself now began to have a price, it cost the Municipality as much as Rs46.14.7 per 100 ferrahts. The total import of stone was in this year only 33,159 tons, of which 4219 tons were required for export vessels, 20,209 tons went to the town and the suburbs, while the balance (8641 tons) was secured by private contractors to the detriment of the public good. The annual require-

ments of the Municipality at this time were however about 200,000 tons. The alarming shortage of stone metal led the Commissioners to re-lay some of their stone or macadam roads with *khoa*, which in 1860 cost about Rs8 per 100 cubic feet of road as against Rs12.10 per 100 cubic feet of stone; and in 1862 the experiment already referred to was made of laying a 'double tramway of stone (China granite) for the exclusive use of carts' in Strand Road. About 1863, when the improvement of the Calcutta roads began to be more carefully studied, Government directed that ballast stone should be landed by the Justices only, and distributed the supply at cost price in the following proportions amongst the several public bodies requiring it :--

Calcutta town $\frac{1}{3}$ ths of the supply, Calcutta Maidan roads under the Commissioners of Police $\frac{4}{5}$ ths, Suburban roads $\frac{4}{5}$ ths, and Howrah roads $\frac{4}{5}$ ths.

The stone was landed at Hastings Bridge, Barabazaar, and Jaganath Ghât, and broken up to a size not exceeding $1\frac{1}{2}$ inches at the House of Correction, the Great Jail, and the Insane Hospital, as well as by the town contractors.¹

In 1869 the whole question was again considered by a Committee appointed by Government, as it had become evident that a considerable quantity of stone was still being obtained by private contractors. The Committee recommended that the maintenance of the existing arrangements, by which the sale of stone-ballast could be made only to the Justices, should continue, but this attempt to place artificial restrictions on the supply and demand proved unsuccessful. Prices rose until they almost touched the price of the indigenous metal, and in 1874 all restrictions on the sale of ballast were removed.

Supply of Country Stone Metal.—Between 1855-59 unsuccessful attempts were made to obtain an adequate quantity of stone metal from Rajmehal. In 1864-65 we read of arrangements being made with contractors to furnish 16 lakhs of cubic feet of stone, broken so as to pass through a ring $1\frac{1}{2}$ inches in diameter, at a charge of Rs35 per 100 cubic feet, landed and stacked at the con-

¹ *Vide* Miscellaneous Papers of 1864.

tractor's expense. The contractors, however, failed, and in 1867 another contract was made with Messrs. Atkinson Brothers, who continued to supply stone until 1903-4 from the Madhia Hill quarry in the Sonthal Parganas. In 1877 the Corporation obtained a lease of this quarry at an annual rent of Rs250, with the object of preventing their contractor from establishing a monopoly. The lease expired in 1880. Messrs. W. L. Atkinson and Co., who were virtually identical with Messrs. Atkinson Brothers, had been granted a sub-lease by the Corporation. The sub-lessee's business failed, and the stone was attached by his creditors, whereupon the Deputy Commissioner of the Sonthal Parganas refused to renew the lease of the Corporation, and granted a lease at a rental of Rs1200 per annum to Messrs. Atkinson Brothers. •

The Commissioner of the Sonthal Parganas instead of confirming this transaction, agreed to put the lease up to public auction, and the bid of the Corporation (Rs3200 for sixteen months from 1st April 1880) was accepted. The Corporation however had no agency for working the quarry, and sub-let it at a rental of Rs1250! No renewal of the lease was sought for by the Corporation in 1881.

Present Arrangements.—Stone metal is now obtained under contract, the supplier delivering it at the Commissioners' depots, of which some are situated by the side of the municipal railway. Where the metal is hauled over the railway, it is measured while in the trucks; at other depots it is measured after being properly stacked by the contractor.

The following depots are now in use :—

1. Baghbazaar, in use in 1848, and extended in 1882-83, 1901-2, 1910-11, and 1911-12. Area about 12 bighas.
2. Karya.
3. Sealdah.
4. Alipore.
5. Orphangunge.
6. Tollygunge.
7. Nimakmahal Ghât.

Difficulties are still experienced in obtaining suitable road metal, and in 1913-14 tenders were invited for a ten years' contract. The tenders received were however so high that the Corporation decided to obtain if possible a quarry of their own, and inquiries are at the time of writing being made. The Improvement Trust is co-operating in the matter with the Corporation. A new metal depot and siding in District IV., for the joint use of the Corporation and the Improvement Trust, has recently been sanctioned (1914-15).

Road Staff.—The first road surveyor was appointed in 1766, but as we have seen, it was not until 1820 that any regular system of road repairs was established.

The Commissioners appointed under Act XVI. of 1847 for the improvement of Calcutta, inherited the system which had been in force under the Chief Magistrate; all important executive duties such as the repair of the roads, the lighting, cleansing, and watering of roads, drainage, etc., were performed by the officer known as the Superintendent of Roads and Conservancy, whose appointment dated from 1835.

This officer was paid by Government and was practically independent of the Board of Commissioners until 1848, when at their request he was placed under their control. It was also arranged that the work of which he was in charge should be carried out under a separate contract for each branch of such work. Section 32 of Act X. of 1852 substituted for this post the office of Surveyor, whose duties included the repair and construction of roads. In 1863 the offices of Surveyor and Assessor were amalgamated, and a Superintendent was appointed to the charge of the Road Department. Mr. Clark, the Engineer, while in England saw candidates for this post, and selected a Mr. Stubbins, who had had extensive experience in road work in London.

In 1868 this department was combined with the Drainage and Conservancy branches, but this arrangement lasted for less than a year, and between 1869 and 1874 the roads branch was worked under the immediate supervision of the Chairman.

In 1874, by another turn of the wheel, the Roads and Conservancy Departments were again combined under the Engineer, assisted by a Superintendent of Roads, who in 1896 was designated the Assistant Engineer (Roads).

Under the reorganisation of 1901-2, roads and conservancy were made over to the charge of the District Engineers, whose staffs are divided into two sections—the engineering and conservancy. The latter section is responsible for *patch repairs*, and the former for all more considerable road work.

The following statement shows the expenditure on roads from revenue funds for the years noted :—

EXPENDITURE ON ROAD SERVICES (REVENUE FUNDS)

Year.	Construction and Improvement.	Maintenance and Watering.	Steam-Rollers.	Road Metal Depots.	Stores.
1864	Rs37,557	Rs2,95,090	Rs12,795	Rs18,440	Rs3,20,581
1876	38,347	3,23,213	7,300	6,998	.....
1888-89	30,374	1,19,837	8,227	15,490	1,46,831
1889-90	30,596	2,87,640	21,264	17,248	1,47,367
1899-1900	1,337	2,02,608	1,655	9,224	2,08,278
1900-1	359	1,60,957	17,808	9,016	1,90,232
1901-2	1,010	1,68,978	19,307	8,488	2,55,361
1902-3	1,60,600	3,88,145	.....	17,534	.....
1903-4	4,80,054		.....	.....	.....
1904-5	.....	1,89,417	.....	18,782	2,71,225
1905-6	.....	2,08,981	13,939	6,165	2,49,703
1906-7	749	1,62,664	19,985	5,756	3,15,815
1907-8	.....	1,74,238	23,935	5,831	2,74,239
1908-9	4,642	1,67,948	22,443	5,775	2,69,909
1909-10	.....	1,66,009	25,770	4,558	3,25,550
1910-11	19,911	3,67,817	62,653	2,881	2,68,205
1911-12	2,01,840	4,32,535	2,112	4,625	3,02,629

Steam-Rollers.—When metalled roads were first introduced into Calcutta, consolidation was effected with stone rollers drawn by bullocks. In 1863, when Mr. Clark visited England to study modern drainage and water-supply systems, he was authorised by the Justices

to purchase a steam-roller. He was not satisfied with any that he saw, and arranged for the construction of a machine according to his own specifications. It was to cost £615, weigh about 12 tons, and to roll a width of 9 feet.

This roller, however, proved a complete failure, and Clark was subsequently authorised to purchase a roller similar in design to those used in Paris. It cost Rs13,200 along with duplicate parts, but proved too heavy for use over layers of *jhama* and too cumbrous in the case of small repairs. In 1875 a light steam-roller was purchased, at a cost of Rs7250, which was supplemented by two rollers of similar type purchased prior to 1888.

The inclusion of the suburbs within the municipal area led to the purchase of four more rollers at a cost of Rs29,000. Since 1892-93 over a lakh of rupees has been expended in purchasing new rollers. A cyclometer is attached to each roller as a check on the work of the roller staff.

Street Watering.—Street watering appears to have first been introduced in 1818. The water was drawn from the numerous public and private tanks in the town and from the aqueducts, which had been constructed to distribute the supply pumped by the engines at Chandpal Ghât and at Nimtola.

The watering was done by *bhistis*, but was to some extent confined to those streets in which the residents raised funds to defray the cost, the superintending staff alone being provided at the cost of the Municipality.

The engine at Chandpal Ghât was worked by Messrs. Jessop and Co. for seven hours a day during eight months in the year, at a fixed charge of Rs360 a month, which in 1835 was raised to Rs400 a month. An annual grant of Sa.Rs17,552 was received from Government, in addition to the amount paid to Messrs. Jessop and Co. We find that between the years 1831-36 savings amounting to Rs25,898 had accumulated, which were expended in the extension of the aqueduct system, strengthening the pumping power, etc. In 1832-33 the private subscriptions in the European quarter amounted to Rs663;

in 1836-37 the amount subscribed had become Rs3500. Chitpore Road was watered from a fund raised in 1819, amounting to Sa.Rs31,850; of this Sa.Rs11,850 had been expended in digging a small tank; the balance yielded an income of about Sa.Rs1000, which was sufficient to defray the cost of watering the street. In 1854-55 the cost of street watering was Rs10,663, which did not however include the expense (Rs6137) of working the Chandpal engine;¹ streets such as Russell Street, Theatre Road, etc., which at that time were not 'general thoroughfares for traffic,' were only watered on the cost being defrayed by the residents.

In 1855-56 the cost of street watering was Rs12,280; in this year water-carts were introduced for areas which had no aqueducts and were remote from tanks. The Administration Reports for the following quinquennium refer constantly to the difficulties experienced in dealing with the *bhistsis*, an independent and refractory class of men, who were unfortunately indispensable to the community.

The water-carts could be worked by ordinary coolies, but were too expensive to be introduced throughout the town except where the aqueduct service was good. Where the residents however of any streets were prepared to defray half the expense, the authorities undertook to arrange for street watering. In 1860 forty-six streets with an aggregate length of $16\frac{1}{2}$ miles were watered, at a total average monthly cost of Rs1866. In 1861 the pumping plant at Chandpal Ghât was strengthened by the erection of a 25 H.P. high-pressure engine with two boilers, which had been purchased for a new pumping-station at Nimtola Ghât, and a fresh plant was ordered for the latter station. In 1862 an improved system for filling the water-carts, the number of which had been increased, was devised, elevated reservoirs being set up in central localities.

In 1865 it became difficult to obtain cattle for the water-carts, and an experiment was made with Californian pumping engines and hose in Strand Road.

¹ Nor an expenditure of over Rs10,000 on the construction of the Jaun Bazaar aqueduct.

Thereupon the *bhistis*, who were still employed in large numbers, struck work. The Justices however on this occasion prevailed, by employing ordinary coolies with buckets, and before long the *bhistis* returned to work.

New difficulties arose from the selfishness of private tank owners, the constant leaking of the aqueducts and the perennial disorders of the pumping plant. In 1874 the Chandpal Ghât engines were greatly strengthened, and at the same time relieved by the general introduction of the filtered-water supply. It became possible to fix ground-hydrants in large numbers, and between 1870 and 1880 the surface area of watered streets increased from under 6 million to over 10 million square feet. The supply of unfiltered water was shortly afterwards much increased by the erection of the Mullick Ghât engines (1885), which were designed to deliver 5 million gallons in 12 hours at the street-level, and of the Watgunge Pumping Station, constructed in 1897 to meet the demands of the new suburban areas. At the present time all the principal streets are watered thrice daily, the less important streets and narrow lanes are watered twice daily, and the paved footpaths are hosed down once a day.

Encroachments and Obstructions.—In 1835 Lieutenant Abercrombie complained of numerous encroachments over public drains, and of the blocking of traffic by ‘shambles and booths’ erected on the roads. Act XIV. of 1856 empowered the Commissioners to remove or alter any projection, encroachment, or obstruction erected or placed against or in front of any house in a public street, whether it was erected or placed there before or after the passing of the Act, and by the legislation of 1863, 1876, and 1888 the authorities were authorised to remove any wall, fence, rail, post, or other projection placed in, on, or over any public drain or sewer. The present Act, section 342, provides also for the removal of any materials or goods deposited on a public street.

In 1902-3 four inspectors were appointed to deal with encroachments, but owing to numerous complaints, which culminated in the temporary closure of several

shops in Barabazaar, this establishment was abolished in 1904-5, and their duties are now performed by the conservancy staff.

In 1913-14 the fees realised on account of licenses permitting the deposit of building materials or the erection of scaffolding on public roads amounted to Rs21,209.

In 1909-10 the system of licensing the erection of sun-screens or *purdahs* in front of shops was introduced; under the present regulations such screens must have a 10 feet clearance above the ground. The fees realised on this account in 1913-14 amounted to Rs5778.

Permanent encroachments over or under the public roads, such as balconies, sunshades, verandahs or the like may be permitted by the General Committee under section 340 of the present Act.

Fees are charged at rates based on the average value of the street land, and varying from 8 annas to Rs2.8 per square foot of space; in 1913-14 the fees amounted to Rs10,600.

Rs8866 were realised in the same year on account of building footings encroaching on public streets.

Arboriculture.—The planting of roadside trees was first sanctioned in 1869, but was discontinued on the ground that expenditure on such a purpose was not authorised by law.

Subsequent legislation made provision for tree-planting, which in a tropical climate is not less necessary than ornamental, and of some of its broader residential streets—notably Loudon Street—Calcutta is justly proud. The adornment of the streets has, however, been frequently carried on with more zeal than knowledge; forest trees utterly unsuitable for town planting have been selected, and instead of trees of one species being planted in long lines, it has been customary to indulge in the indiscriminate planting of trees of varying habit.¹

In 1905 it was proposed to appoint a conservator to attend to the trees in public streets and squares, but it was decided to leave this task to the Squares Committee.

¹ *Vide* the report of Mr. Lane, the arboriculturist who was called in to advise the Corporation in 1914.

In 1914 a complete survey of all the roadside trees in Calcutta was made by Mr. Lane, of the Royal Botanical Gardens, and effect is being given to several of his proposals. Government have sanctioned an arrangement under which he will inspect the trees twice a year, and a small municipal staff is to be appointed to take charge of the planting and maintenance of new trees, which will be obtained from a nursery in the Alipore District Office compound.

Footpaths.—The construction of footpaths in Calcutta was first commenced on Clark's suggestion, who elaborated the idea in connection with his drainage scheme.

His surface drains were placed at distances of 4 to 10 feet from the sides of the streets, and the spaces thus set apart were appropriated to foot passengers.

Footpaths would thus necessarily follow on the construction of the drains, and power to expend municipal funds for the purpose was conferred on the Commissioners by section 9 of Act XIV. of 1856. The innovation at first met with considerable criticism. The cynical declared that the people would always prefer the middle of the road to any footpath, while the shopkeepers complained that trade would flow to those streets where customers could still step from their carriages into the shops. Public opinion, however, was soon convinced of the value of Clark's idea, and the extension of footpaths became chiefly a question of funds. The first footpath in Calcutta was constructed in Chowringhee, which was selected for the experiment mainly for the purpose of protecting the new gas lamp-posts, which had, with the object of diffusing the light, been placed at a distance of 20 feet from the walls of houses, and the Commissioners claimed that in 1858 'nine-tenths of the foot passengers make use of the footpath.'

In that year nearly Rs4000 were spent on the new footpath, which for purposes of experiment was constructed partly with plain metalling, partly with a coating of gravel, soorkhi, and asphalt, and partly with flagstone.

In the three years 1860, 1861, and 1862 the Municipality spent Rs6000, Rs16,711, and Rs13,318 respectively in

the extension of footpaths, the construction of which depended on the progress of the drainage scheme, and by 1875 it is estimated that about 70 miles of footpath had been laid.

The spare earth excavated in laying the sewers was utilised for raising the footpaths to the proper level, and ashes, building rubbish, and broken bricks from Kotrung were used for consolidation.

It was not however until 1902-3 that a regular programme for the paving of footpaths was adopted. Since then great progress has been made, and the cost of the paving carried out in 1913-14 alone amounted to about Rs6½ lakhs.

The paving of the old sewered ditches—narrow gullies used only by foot passengers—has also been taken in hand in recent years ; in 1913-14, 156 of these passages were paved at a cost of Rs76,000.

Kerbing and Channelling.—Kerbstone was first used in constructing the Chowringhee footpath, which at the points where it was intersected by cross-streets was marked by a kerb 'for the sake of guiding drivers of vehicles and protection of lamp-posts. This arrangement was, moreover, necessary to ensure the efficiency of the surface channels, which receive the storm-water flowing out from intersecting streets.'¹ Channel stone was subsequently added to the system to facilitate surface drainage and the cleansing of the roads. During the twenty-five years ending 1910-11, about Rs5 lakhs were spent in providing footpaths with kerb and channel stones, and the expenditure more recently has been even greater. In 1913-14 it amounted to about Rs44,000, and the comprehensive scheme which had been taken in hand was practically completed in the following year.

Harrison Road.—This sketch of the development of the Calcutta road system may be completed by an account of three roads, which have an interesting history of their own. In 1884 a Committee was appointed to consider the question of street improvements.

After considering estimates for widening Bentinck

¹ Report of 1858.

Street, Chitpore Road, Cotton Street, and Machua-bazaar Street, the Committee were of opinion that the most useful project which the Municipality could finance would be the opening out of a new road from the Hughli Bridge to Sealdah. It was thought that by the acquisition and re-sale of surplus lands on either side of the proposed road, the major part of its cost might be recouped. The project however could not be financed except by raising a new loan, and in this direction the Municipality met with no encouragement from Government. The scheme therefore was for the time abandoned. In 1887 it was revived, and the Town Council, while averse to the acquisition of surplus *interior* lands on a large scale, accepted the Chairman's compromise of acquiring *frontage* lands; the following proposal was adopted:—

‘That in taking up land for the new road the Commissioners should follow the principle of acquiring a considerable strip of land outside the regular line of the proposed street, the precise width being settled by the Committee.’ In adopting this policy the Commissioners had in view the twofold object of recoupment and of the redistribution of frontage lands into convenient building sites. The Government of India was prepared to lend 2 lakhs for three years without interest, but the work was not actually taken in hand until the new Corporation of 1889 came into being.

A loan was then raised, the interest on which was to be met from the 2 lakhs advanced from the Howrah Bridge Fund by the Port Commissioners, and the work, divided into sections, was begun in 1889 and completed in 1892-93. The net cost of the project, after allowing for the sale of surplus lands, had been estimated at 18½ lakhs, but in the result the estimate was much exceeded, and the net cost amounted to 28½ lakhs. The road is 8700 feet in length and 70 feet wide. The sale sheets of the surplus lands give some surprising figures; the land acquired for Section I. (from Strand Road to Clive Street) cost on an average Rs12,000 per kotha,¹ while

¹ One kotha = 720 sq. ft.

the prices realised on re-sale ranged from Rs10,000 to Rs38,000 per kotha ; in Section II. (Clive Street to Chitpore) the Corporation paid an average rate of Rs15,500 per kotha, and sold its surplus lands at rates ranging from Rs7500 to Rs80,000 per kotha.

Halliday Street.—In 1854 a scheme was projected for opening out a new and important street 16,000 feet in length, linking up Dharamtola with Baghbazaar. The estimated cost was only 11 lakhs, but this expenditure was far beyond the resources of the Board of Commissioners, and it was decided to take up only a short section 1720 feet in length, extending from Kolutola Street to Machua Bazaar, the scheme being financed from the conservancy funds. The difficulties, however, of compulsorily acquiring land for public purposes were so great in a town like Calcutta that the Commissioners, after completing the first section, abandoned the scheme. The law of land acquisition for municipal improvements was contained in Act XXII. of 1847, as amended by Act XII. of 1852.

The Commissioners under these Acts were expected to enter into treaty with proprietors for the acquisition of their lands, and only as a last resort to proceed to the alternative laid down in the law of calling on the Sheriff to appoint a jury to value the lands. In the result it proved necessary to apply for a jury in the case of every proprietor. The Municipality was, moreover, definitely barred from engaging in further improvement schemes by an important ruling of the Supreme Court in 1856, holding that the Act did not empower the Commissioners to take up more land than was necessary for the direct purpose of the street.

A representation was made to the Local Government, and sections 7 and 8 of the general Act XIV. of 1856, for the conservancy and improvement of the town, contain some recognition of the principle of recoupment. The section of the street which was constructed in 1854-55 and called Halliday Street cost Rs58,600. The street was only 38 feet in width. The land was purchased at rates varying from Rs100 to Rs150 per kotha.

Strand Road.—In 1820 the Lottery Committee con-

sidered the question of constructing a road and wharf along the western boundary of Calcutta, to the north of the Old Fort Ghât. Even at that early date difficult questions of title to the alluvial lands along the Hughli had arisen. The Committee was of opinion that Government had an incontestable right to all alluvial lands not included in the *pottas* of the river-side proprietors, 'whether the same had been formed by the spontaneous desertion of the stream or by artificial means.' A case was submitted to the Advocate-General (Mr. R. Spankie) for opinion, but he felt so much diffidence in his judgment that he advised a reference to English lawyers.

Such a reference was made, but the proceedings of the Lottery Committee subsequent to 1820 are missing, and no other record of the opinion given by English lawyers is available. It appears that some of the potta-holders demanded compensation, which was paid to them, while others freely surrendered their lands to the East India Company for the purpose of the road, reserving however to themselves their right to the land west of the road down to the water's edge.

The actual construction of the road appears to have begun in 1828, the work being financed by public subscriptions, raised in the form of shares, which were repaid with interest from a toll levied on passengers and vehicles at the bridge across the mouth of Tolly's Nullah. The cost was estimated at 1½ lakhs, but there is no record in the Municipal Office to show when the road was completed nor what it ultimately cost. No other of the fine public works which Calcutta owes to the Lottery Committee compares in its far-reaching importance to the Strand Road; had the encroachments of the potta-holders, on what was subsequently known as the Strand Bank, been allowed by flux of time to harden into uncontested possession, it is not easy to compute the magnitude of the difficulties which later on must have blocked the development of the Port of Calcutta.

Strand Bank.—The improvement of Strand Bank is closely linked up with the history of Strand Road. At its first formation the bank appears to have been the

result of alluvial deposit; subsequently spurs were thrown out westward from the road by the Military Board with the object of protecting the river side of the Fort from erosion. The Municipality contributed largely to the reclamation of this valuable land by depositing for many years the sweepings of the town upon the alluvion so formed, and in course of time the assumption grew up that the Corporation, in whom was vested the right of property in the town sweepings, had acquired a title in Strand Bank itself.

In 1848 the sweepings, which were reported to cause a nuisance, were covered up and consolidated by the Municipality. The property became valuable and the income it produced formed the Strand Bank Fund, which was utilised by Government not only for improving the property itself, but for draining and planting the Maidan, the embellishment of the Eden Gardens, and works on the Esplanade. In 1851 the question of title in the accreted lands became a matter of general discussion, and Government, which claimed that 'that land is now and has been from its formation in the continuous possession of Government, by its officers or tenants,' prepared the draft of an Act 'for declaring and confirming the title to certain land recovered from the River Hooghly.' A memorial was submitted to the Government of India by persons owning land on the west of Strand Road, in which they claimed to have retained a title in the river-side or alluvial lands, when Strand Road was originally constructed. Lord Dalhousie, however,¹ was satisfied that the title of Government to the accreted land, of which it had been in undisturbed possession for many years, could not be seriously disputed, and decided to proceed no further with the draft Act. He admitted that the potta-dars in 1820 had been given to understand that the land in front of their holdings was to be used as a road, affording them the advantage of a road and river frontage, and he stated that the design of Government was to use the accreted land 'permanently, and exclusively, for purposes of public utility connected

¹ October 1852.

with the trade, the traffic, the health and the convenience of the community, in furtherance of which design, roads, ghâts, wharves and the like may be made, but not elevated buildings are in contemplation.'

Under Act X. of 1866 a Committee of the Justices was appointed 'for the Improvement of the Port of Calcutta.' Government offered to make over to the Committee its right and interest in the Strand Bank, which then yielded an income of about Rs4000 a month, between Chandpal Ghât and Circular Canal Lock, on condition that the Justices would undertake all works on the Strand Bank and the Esplanade, formerly charged to the Strand Bank Fund, and would observe the understanding on which the potta-dars had given up their claim ¹ to the Strand Bank, viz., that no houses should be built on it but that it should remain an open quay, with only such buildings on it as were required for the traffic of the Port.

The Justices however were not prepared to accept Strand Bank upon these conditions. The Committee appointed for the improvement of the Port did much preliminary work to pave the way for the Port Commissioners created by Act V. of 1870. The Strand Bank lands, from Chandpal Ghât to Aheeritollah, were then leased by Government in perpetuity to the Port Trust as a source of revenue, at an annual quit rent of Rs37,292. The Justices submitted a memorial to Government, praying that 'the land to the west of the Strand Road forming the Strand Bank, or such portion thereof as lies to the north of Armenian Ghât, be vested in the Justices as representing the inhabitants of the town of Calcutta, and also that Act V. of 1870 might not extend thereto'; but the opinion of the counsel to whom they submitted their case was adverse to their claim of ownership, and Government declined to grant their petition.²

¹ i.e. in 1852.

² Proceedings of Justices, 6th July 1871, and Government of Bengal's letter, No. 1427 T, dated 11th August 1866, Government of Bengal's letter, No. 4871, dated 20th June 1863, to Government of India, containing a note on the ownership of Strand Bank. Government retained the right to defray the charges on account of Eden Gardens, the Maidan roads and drainage, and the section of Strand Road between Chandpal Ghât and Hastings, from the income derived from the Strand Bank lands.

Bridges.—The bridges—thirty-eight in number—bordering on or within municipal boundaries belong either to Government, the Port Commissioners, or the Corporation. They are enumerated below :—

I. Over the Circular Canal

- (1) Chitpore Bridge.
- (2) Barrackpore Bridge.
- (3) Dum-Dum Bridge.
- (4) Ultadinghi Bridge.
- (5) Manicktollah Bridge.
- (6) Gas Street Bridge.
- (7) Beliaghata Bridge.
- (8) E.B.S. Railway Main Bridge.

II. Bridges over Railway Lines

- (1) Beliaghata Bridge.
- (2) Convent Road Bridge.
- (3) Asti Palit Road Bridge.
- (4) Gobra Road North Bridge.
- (5) Tiljola Road Bridge.

III. Railway Bridges over Roadway

- (1) Russa Road Bridge.
- (2) Tollygunge Circular Road Bridge.
- (3) Chetla Road Bridge.

IV. Over Tolly's Nullah

- (1) Port Trust Railway Lift Bridge.
- (2) Hastings Bridge.
- (3) Kidderpore Bridge.
- (4) Zeerut Bridge.
- (5) Alipore Bridge.
- (6) Kalighat Bridge. •
- (7) E.B.S. Railway Bridge.
- (8) Tollygunge Bridge.

V. Over Storm-Water Head-Cut (Town)

- (a) Three foot bridges.
- (b) Two cart bridges.

VI. Over Storm-Water Head-Cut (Suburbs)

Two cart bridges.

VII. Over the Boat Canal and Docks

- (1) Garden Reach Road Swing Bridge.
- (2) Circular Garden Reach Road Swing Bridge.
- (3) Kantapuker Foot Bridge.
- (4) Diamond Harbour Road Bridge.
- (5) Tollygunge Circular Road Bridge.
- (6) Chetla Road Bridge.

VIII. The Howrah Pontoon Bridge over the Hughli.

The bridges included under heads I. to IV. belong to Government or the Port Trust. The roadway of the Circular Canal bridges which are outside municipal limits, and of the railway bridges under head II., is lighted and maintained at the cost of Government, which is also responsible for the lighting and repairs of the bridges under head III.

The Corporation is responsible for the lighting and maintenance of the roadway of those Tolly's Nullah bridges which are within municipal limits, viz., the bridges at Hastings (excluding the lift bridge, which is in charge of the Port Trust), Kidderpore, Alipore, Kalighat, and Tollygunge. 'The Kalighat bridge, which was originally constructed for foot passengers, was rebuilt in 1890-92 at a cost of about Rs75,000, towards which the Corporation contributed Rs30,000, the balance of the cost being borne by Government. It was strengthened and widened in 1907-8 at a cost of Rs20,000, one-third of which was paid by the Corporation.'

The Zeerut and E.B.S. Railway bridges are entirely maintained by Government.

The bridges under heads V. and VI. are of course maintained and managed by the Corporation.

The bridges falling under heads VII. and VIII. are owned, managed, and maintained by the Port Trust. The Hughli Bridge is constructed of fourteen pairs of wrought-iron pontoons. The bridge is opened in the centre at duly published times to allow of the passage of shipping. It was constructed by the Port Commissioners in 1873-74 at a cost of 18 lakhs of rupees.

(b) BUSTEES

(CLEARANCE OF INSANITARY AREAS)

What is a bustee?—Act II. of 1888 contained the first legal definition of a bustee. The definition in Act III. of 1899, which is more precisely phrased, runs as follows :—

“ ‘Bustee’ means an area containing land occupied by or for the purposes of any collection of huts—

‘ (a) Standing on a plot of land not less than 10 cottahs in area, and bearing one number in the assessment book ; or

‘ (b) Standing on one or more plots of land which are adjacent to one another, and exceed in the aggregate one bigha in area.’

‘Bustee land’ means land in a bustee which is let out for the building of huts under any arrangement by which the tenant of the land is owner of the hut ; the rates are recoverable from the owner of the land, after deducting therefrom one-eighth of the rate, chiefly as a set-off against his cost of collection of the tenant’s share. The early administration reports abound with eloquent descriptions of bustees, which leave nothing to the imagination ; buried away in the Report of 1868 is a gem of realism on which it would be difficult to improve ; we quote it in an abridged form :—

' A bustee, or native village,¹ generally consists of a mass of huts constructed without any plan or arrangement, without roads, without drains, ill-ventilated, and never cleaned. Most of these villages are the abodes of misery, vice, and filth, and the nurseries of sickness and disease. In these bustees are found green and slimy stagnant ponds, full of putrid vegetable and animal matter in a state of decomposition, and whose bubbling surfaces exhale, under a tropical sun, noxious gases, poisoning the atmosphere and spreading around disease and death. These ponds supply the natives with water for domestic purposes, and are very often the receptacles of filth. The arteries which feed these tanks are the drains that ramify over the village, and carry the sewage of the huts into them. Their position is marked by a development of rank vegetation. The entrance to these bustees are many, but not easily discoverable, whilst the paths are so narrow and tortuous that it is difficult for a stranger to find his way through them. The huts are huddled together in masses, and pushed to the very edge of the ponds, their projecting eaves often meeting one another, whilst the intervening spaces, impervious to the rays of the sun, are converted into necessaries, and used by both sexes in common. In these huts often live entire families, the members of which occupy the single apartment of which it is not unfrequently composed, and in which they cook, eat, and sleep together; the wet and spongy floor with a mat spread on it serving as a bed for the whole. . . . None of these villages possess a single road or thoroughfare, properly so called, through which a conservancy cart or even a wheelbarrow can pass in order to remove the filth. This filth is laid at the door of every hut or thrown into a neighbouring cesspool.'

Early Experiments in Bustee Reclamation.—The early administrators of Calcutta were not blind to the possibilities for inexpensive town improvements offered by these bustees or irregular groups of huts occupying land, which from its want of municipal amenities, insecurity

¹ A bustee is in the early Reports referred to frequently as a ' block of huts ' or as a ' native village.'

of tenure, or the poverty or apathy of its owner, had not yet been used for masonry buildings. Thus Mr. Camac's estate in Short's Bazaar was purchased and developed by the Lottery Committee in 1826. Both the lack of funds, however, and the absence of statutory powers subsequently proved a bar to the initiation of such schemes. The latter difficulty was in part removed by section 23 of Act XIV. of 1856, which authorised the Commissioners to require the owners or occupiers of bustees, which through want of drainage or proper ventilation were 'attended with risk of disease to the inhabitants or the neighbourhood,' to *execute such works* as the Commissioners might think necessary for the avoidance of such risk. Early experiments in bustee reclamation, however, adhered to the principle of acquisition. In 1858 a plot of land measuring 9 bighas 5 kothas, known as Dunkin Bustee (bounded on the north by Park Street, on the east by Wood Street, on the west by Camac Street, and on the south by residential houses), was acquired by the Commissioners for Rs45,000 ; it was crowded by huts occupied chiefly by domestic servants and native livery stables, and was 'a great nuisance to the residents within its immediate vicinity.' A tank was excavated on the triangular plot at the corner, to provide a 'good supply of wholesome water fit for drinking.'¹ The surplus land to the south of the tank was at once sold in four plots for Rs27,427, on the express condition that houses valued at not less than Rs100 per mensem should be built thereon.

The comment of the Commissioners on the operation is of interest :—'The result of the Dunkin Bustee improvement (they wrote) has proved two very important facts, viz., that the clearance of Bustees can be effected without any actual cost to the town, and that building sites in suitable localities, and conveyed under a title given by the Commissioners, will find ready purchasers.'

The success of this scheme, and the demand for additional building sites, encouraged the Commissioners to prepare similar schemes, which we will briefly describe,

¹ The Allen Square of course now occupies this site.

in respect of three other bustees, viz., the (1) Money Bustee, (2) Bamun Bustee, and (3) Jaun Bazaar Bustee.

(1) The first-named bustee belonged to a Mr. J. W. B. Money ; it was bounded on the south by Theatre Road, on the east by Loudon Street, on the west by Hungerford Street, and on the north by Short's Bazaar Tank ; it measured nearly 21 bighas in area. The Commissioners guaranteed Mr. Money Rs38,000 for the land, and he was also to receive any sum in excess of that amount realised by the re-sale of the land in building sites, after opening out what is now known as Outram Street, the land required for which was to be conveyed to the Municipality free of cost. The land was resold in thirteen building sites for Rs39,871, which was paid to Mr. Money, while the road was made by the Municipality. The purchasers of the building sites, with frontages on existing streets, were bound to construct thereon, within a fixed time, houses valued at not less than Rs100 per mensem ; on the allotments with frontage on the new street, houses valued at not less than Rs50 per mensem were to be erected.

On the Lieutenant-Governor's suggestion it was also provided that, after making due allowance for necessary outhouses, the remaining boundaries were to be fenced in by iron railings, but this condition appears to have been very liberally construed, or at least lost sight of later on.

(2) Bamun Bustee, bounded on the north by Theatre Road, on the east by Hungerford Street, on the west by Camac Street, and on the south by Lower Circular Road, opposite Woodburn Park Road, was about 54 bighas in area, and belonged to Mr. Peterson, a barrister. In the centre of the bustee was a large tank, which was in 1859 conveyed free of cost by Mr. Peterson to the Commissioners in perpetuity ; the Commissioners for their part were to improve and rail off the tank and construct a road 40 feet in width, linking up Wood Street with Circular Road, while two cross roads, each 30 feet in width, were to run east and west between Theatre Road and Circular Road, linking up Hunger-

ford and Camac streets. The rest of the land was to be sold by Mr. Peterson as building sites, on which only houses of a superior class, rented at not less than Rs80 per mensem, were to be erected. These buildings were to be bounded by iron railings, except where the out-offices formed the compound wall. It will be evident that the Commissioners undertook to develop Mr. Peterson's property in return for the gift of a tank, which as improved became Victoria Square; on the credit side they also placed the clearance of a congested and insanitary area, the provision of several good sites for houses suitable for Europeans, and yielding a large sum in municipal rates, and lastly, a good supply of what was at that time accounted pure and wholesome water. The scheme appears to have cost the Municipality about Rs20,000.

(3) In 1860 the Commissioners received complaints from some medical practitioners of the insanitary condition of what was known as the Jaun Bazaar Bustee. Some improvement was effected by a scheme which involved the construction of Grant Street and the opening out of several lanes wide enough for the passage of conservancy carts. Many years later further improvements were made in connection with the construction of the Central Municipal Offices.

Bustee Policy after 1863.—Act VI. of 1863 vested the Justices with important powers against the owners of Bustee lands, as distinguished from the poorer classes, who owned and occupied the huts erected thereon; but in spite of a report submitted by the Health Officer in 1871, specifying bustees against which action should in his opinion be taken under that Act, the Justices shrank from the opposition which drastic measures would have aroused. In 1875 Government drew the attention of the Justices to the matter, and a committee was appointed to inspect and report on certain selected bustees. It was generally agreed that energetic measures were necessary, but the law was now found to be defective.

Act IV. of 1876 contained provisions on the lines of the present Act. Its sections 280-286 empowered the

Commissioners to have any bustee inspected by two medical officers, and to call on the owner to execute any improvements deemed necessary by these officers; if the owner remained obdurate, the work was to be executed by the Corporation at the owner's cost. The Local Government took powers to interfere if the Commissioners neglected to exercise the powers bestowed on them.

The employment of their extensive powers by the Commissioners was however no easy matter; even if the ruthless exercise of such powers had seemed expedient, the recovery of the costs must have been beset with difficulties. It seemed to promise better results if the problem were handled in a conciliatory spirit, the willingness of the Municipality to co-operate being not less evident than its power to compel. It was however some years before anything was done. Dr. Payne, the Health Officer in 1877, organised an establishment for the surface conservancy of bustees, but the Corporation declined to sanction his proceedings, and the establishment was discharged. It was not until 1883 that the problem was seriously attacked, in spite of Dr. Payne's zealous efforts, continued throughout the whole period of his office. In 1882 the first Bustee Committee was formed, and in 1883-84, on the suggestion of the Chairman, a grant of $1\frac{1}{2}$ lakhs was sanctioned for bustee improvements. An amending Act (VI. of 1881) added section 283A to the Act of 1876, and gave the Commissioners power to acquire bustees for the purpose of improving them, but the reclamation of the Jorabagan Bustee is the only instance of the exercise of this power.

The condition of many bustees was however improved in the course of the Drainage Department's operations; between the years 1876-83 no less than $7\frac{1}{2}$ miles of open ditches in bustees were sewered, filled in, and converted into paths; the area of bustee land served by such passages was 1400 bighas. By 1883-84 about 200 bighas of bustee had been improved, and measures had been taken to improve another 400 bighas. The Administration Report of 1883-84 estimates that the

value of five bustees improved in that year, at a cost of Rs1,84,000 to the Municipality, was thereby increased by Rs13 lakhs, while the rates were increased by Rs11,000 per annum. The improvements effected under the Act of 1876, however, did not unfortunately go far enough; the essential feature of a bustee improvement scheme is undoubtedly its roads, and the passages opened out in the early part of this important campaign were far too narrow to give adequate light and air to the congested groups of huts which formed a Calcutta bustee.

Legislation of 1888 and 1899.—The Act of 1888 offered alternative methods for dealing with bustees. One method gave the bustee owner the opportunity of preparing a scheme of improvement for the consideration of the Commissioners; the obligation of putting into execution the plan as finally approved, modified or added to, was to be enforced by the Commissioners' refusal to sanction the building or rebuilding of any huts in the bustee until their orders were carried out.

The alternative procedure was more direct and effective; the Commissioners might appoint two medical officers¹ to prepare after inspection a *standard plan* of any bustee, with a schedule of the works to be executed to bring the bustee into conformity with the plan. In default of the owner carrying out the requisitions of the Commissioners, the latter might execute the work at the owner's cost.

The roads opened up in the bustees remained private streets, unless the owner vested them in the Corporation. In practice, however, the roads were usually constructed at municipal expense on the owner making over land for the purpose free of cost.

Act III. of 1899, chap. 26, corresponds closely with the provisions of the earlier Act, but some important changes in procedure were adopted by the Commissioners. The cost of road-making was thrown more generally upon the bustee owner, with the beneficial result that he frequently preferred to take the land out of the category of 'bustee' by removing the huts. •

¹ Under Act III. of 1899 one of the inspecting officers must be an engineer.

Where bustees remained, the salutary policy of having spaces for the admission of light and air opened up between huts was adopted, but somewhat fitfully enforced. In 1904 the practice of executing the improvements departmentally, and recovering the cost from the owners, was abolished in view of the difficulty of collection.

Between 1885 and 1896 the Commissioners had spent, also from their own funds without any intention of recoupment, no less than Rs13,81,296 on bustee improvements, and Rs9,81,401 on bustee conservancy, of which the latter charges, in the opinion of many, were at that time regarded as properly a liability of the bustee owner, though the conservancy of bustees has since been accepted as a municipal service. A bustee conservancy establishment was organised in 1883-84; it was merged in the general conservancy establishment of the town in 1899-1900, and the same step was taken in respect of the suburbs in 1901-2. In the last decade very striking progress has been made in the reclamation of bustees, and the charge preferred against the Corporation, constituted under Act II. of 1888, of having 'played with the bustee question,' could certainly not be truthfully levelled against its successor. Between 1906 and 1914 about 11 miles of well-laid macadam roads, usually 20 feet in width, have opened up several of the remaining bustees of Calcutta, and 7 miles of sewers have been laid; in addition to the vast improvement implied by these figures, it should be remembered that many large bustees have been swept away and replaced by blocks of masonry buildings, while the ventilation of others has been improved by the opening out of cross-passages 6 or 8 feet wide between huts, and the provision of numerous bathing-platforms, public necessities, and a pure water supply for bustee residents.

In short, it would not be easy to exaggerate the value of the spade-work which the Bustee Department has done in recent years. Many bustees are still taken up each year for improvement, the activities of the Department being more and more engrossed by the insanitary blocks comprised within the outlying area of the city,

and it is safe to predict that the want of foresight which permitted Northern Calcutta to develop without a plan, will find no counterpart in the growth of Greater Calcutta.

Alignment of Growing Bustees.—An auxiliary branch of the Department was established in 1902-3 to prevent in the sparsely populated portions of the added area any repetition of the insanitary conditions of the town bustees. All areas in which bustees were springing up were *aligned* by the General Committee, *i.e.* alignments ordinarily 40 feet apart were prescribed, and demarcated by pegs on the ground, and the building of no hut is permitted such that the distance measured from its eave to any alignment is less than 6 feet. The effect of this provision is that a passage 12 feet in width will be left between each line of huts, while the Committee may also prescribe and has prescribed a regular system of roads, not exceeding 20 feet in width, for these areas.

No hut may be built on the space left for these embryo roads, and no masonry building within 20 feet of such road (or indeed within 20 feet of the centre of any bustee road laid down in any standard plan); thus in the course of time, as these undeveloped areas are used for masonry building sites, a system of roads each 40 feet in width will automatically mature, posterity being burdened only with the cost of construction and acquisition of vacant land—not with the heavy expense of acquiring built-up areas for the opening up of streets. The alignment of the outlying lands of Calcutta has been carried out on a most extensive scale; the work was completed in 1909-10, but by an oversight the hearing which the law prescribes should be given to the bustee owners was omitted from the proceedings, and it became necessary to do the work afresh. The practical results of the work in 'growing bustees' is not yet apparent; it is certain that the charges on posterity will be heavy, but they will be spread over many years, and will be trifling in comparison with the outlay which the Calcutta Improvement Trust is compelled to incur in rectifying the omissions of the past. As the roads gradually mature, it should not be a matter of difficulty to determine which, as the

most important avenues of traffic, should be widened beyond the 40 feet maximum given under the bye-laws.

Tank Filling.—It will be convenient briefly to describe here the measures taken by the Commissioners for the removal of one of the most insanitary features of Calcutta—the noisome tanks or ponds which abounded in the town. Section 81 of Act XIV. of 1856 authorised the Commissioners to compel the owners of stagnant or noisome tanks, which were injurious to health or offensive to the neighbourhood, to fill up, cleanse, or de-water such tanks. This provision was repeated in the Acts of 1863 and 1876, and extended by the amending Act VI. of 1881 to wells. The first definite proposal to enforce the law is contained in the Health Officer's Report on Bustees in 1868, but tank-filling as a part of the sanitary policy of the Commissioners was not taken in hand until 1876, when several outbreaks of cholera were attributed by the Health Officer to the use of water from filthy tanks. In an account of these abominations, Dr. Payne affirms that 'no power of rhetoric could force conviction further than words of simplicity and truth,' and the plain unvarnished description of an insanitary tank which follows is certainly not lacking in force.¹

The dearth of suitable material for filling up the tanks was a serious difficulty, but it was finally decided with some hesitation on the advice of the Health Officer, to utilise road-sweepings for the purpose, a layer of earth being placed on top. Even the supply of road-sweepings proved inadequate, and the view expressed in the Magistrates' court that this method of filling created a nuisance was reinforced in 1888-89 by the opinion of Dr. Simpson, Health Officer; the use of these materials was accordingly prohibited. In 1881 a Tank Committee was appointed, which recommended that the filling up of private tanks, which were a danger to the public health, should only be enforced after a careful analysis of the water, and in 1883-84 Government was advised by its sanitary officers that the existence of tanks in bustees secured at least some open space, and that the policy of improving rather

¹ Pp. 19-20, App. I., Report for 1876.

than of obliterating the larger tanks was in their view preferable.

The Commissioners improved on this policy by acquiring and filling up the tanks now occupied by the following squares, viz., Komedanbagan Square (1884-85), Harakumar Tagore Square (1884-85), Jorapuker Square (1885-86), and Blacquire Square (1886-87). By 1883-84 about 162 tanks were said to have been filled up by the Municipality and 16 by private owners, and the number of tanks remaining to be filled up, *i.e.* within the old town boundaries, was estimated at about 350.

By 1888 it was said that 240 tanks had been filled up and that about 331 remained to be dealt with.¹

Act II. of 1888 placed several thousand tanks within municipal limits; in Ward 22 alone it was estimated that there were 823 tanks, of which none were reserved or protected in any way.

The campaign, initiated in 1877 by Dr. Payne, was however steadily prosecuted, and by 1910-11 it was calculated that over one thousand tanks (including many in the added area) had been filled up.

The nuisance as regards the old town area may now be said to have been removed, but although the tank-filling policy is being steadily pursued, it must be many years before any great impression is made on the insanitary tanks which swarm in the low-lying tracts of the added area.

In 1914-15, 164 tanks were filled up, as the result of 514 proceedings which were in progress in the course of the year; 397 of these cases related to District IV.

¹ These figures are obviously not very accurate.

CHAPTER VIII

(a) PUBLIC SAFETY

1. POLICE

Police Charges, how defrayed in early days of Calcutta.—We have seen that by statute 33 Geo. III. ch. 52, the conservancy of Calcutta was vested in the Justices, who were authorised, for the purpose of defraying the expenses of repairing, watching, and cleansing the streets, to make an assessment on the owners and occupiers of houses, etc., situate within the town. They were authorised also by section 159 of the statute to raise an abkari tax by the grant of licenses for the sale of spirits. These two funds—the abkari and the house tax—might be regarded as strictly belonging to the town; from the Fever Hospital Committee's report we learn that in 1836 the house-tax amounted to Sa.Rs1,97,200 and the abkari to Sa.Rs1,46,100, making a total of nearly three lakhs and a half. The produce of these taxes, after deducting collecting charges, was paid into the General Treasury. Against this revenue were charged the expenses of cleansing, watching, and repairing the streets, estimated in 1836 at Sa.Rs2,83,866, but a further sum of Sa.Rs2,46,128 was expended by Government for 'judicial and conservancy charges,' under which head were included the cost of the magistracy, Police Hospital and House of Correction, prisoners' diet charges, and other contingent judicial expenditure, fire engines, watering, lighting, etc.

The total 'police' charges therefore aggregated Sa. Rs5,29,995, the excess over the two sources of income noted above being paid by Government from other sources of revenue. The Fever Hospital Committee had recommended that some portion of the Canal Tolls, the

ground rents of Calcutta, and also the abkari revenue should be added to the house-tax, the whole constituting a Municipal Fund, out of which police charges in addition to purely municipal charges should be met. The excise taxes were however absorbed into the general revenue, and Act XXVI. of 1845 rescinded section 158 of 33 Geo. III., which had empowered the Justices to grant licenses for the sale of spirits.

Act XVI. of 1847 constituted a Board of seven Commissioners for the improvement of Calcutta; conservancy functions (nominally vested in the Justices, but actually exercised by the Chief Magistrate) were withdrawn from the Justices and vested in the Board. Municipal management was separated from the administration of the police, and its cost defrayed from the proceeds of the house-tax and the newly imposed carriage and horse tax; all expenses connected with the police fell upon Government, which however had appropriated the abkari tax. In 1867 the Government of India insisted on the cost of the police being met in part from municipal funds; it is necessary to give some account of the steps which led to this action, and of the long controversy which only ended with the removal of the burden in 1888.

Liability for Police Charges raised in 1864.—In 1864 the Inspector-General of Police, in discussing the manner in which the police charges for the city and suburbs were borne, pointed out that Calcutta contributed nothing whatever to its own protection, not even Police Stations, which were ‘hired at very high rents.’

He considered that as a matter of principle ‘at least the larger share of the cost should be raised locally,’ but nevertheless recognised that at that time a great strain was placed upon the local resources in providing for drainage works, general sanitation, and water supply. In view of the interest of the Government in securing healthy surroundings for their troops at Fort William and Alipore, he suggested that Government might recognise some liability to contribute to works of municipal improvement, while calling upon the Justices to assume

the management and maintenance of the City Police. Colonel Bruce's memorandum was forwarded to the Justices, and an expression of their views invited.

The question, with its historical setting, was discussed by the Chairman in an able note, and his views were accepted by the Justices. It was admitted that the inhabitants of Calcutta might fairly be asked to defray the expenses of any police expressly maintained for municipal purposes; it was argued that Government should pay for all police maintained not only for the protection of Government depots, but also for the protection of the Customs, Salt and Abkari Revenue, and for the control of the troops garrisoned in Fort William and of the seamen of the Port of Calcutta; it was urged that Government should contribute towards the expense of works of municipal improvement some percentage of the large revenue which it raised within the town of Calcutta, and that the question of a police-rate should be deferred until the amount of such contribution should be fixed.

The Lieutenant-Governor of Bengal admitted the force of the Chairman's arguments by urging the Government of India to contribute Rs1,50,000 towards the cost of the police, Rs3,64,000. The Government of India, having regard to the 'exigencies of Imperial finance,' were unwilling to make any contribution except for the cost of the police employed expressly for imperial purposes, and in 1865 the Justices in accepting this ruling, and resolving that a police-rate should be levied on the occupiers of rateable property, made a further appeal to the Local Government for financial assistance.

Act XII. of 1867.—A Bill however was drafted by which the entire charges were thrown on the Municipality, and provision was made for a police-rate to raise the necessary funds. A further representation was submitted to the Local Government, which however declined to do more than pay Rs26,722 a year for the river police and the police attached to the jail and public offices, together with a further sum equal to one-fourth of the remaining police charges. Even this grant was

made conditional on the Municipality assuming responsibility for all expenses connected with the Pauper Hospital. Act XII. of 1867 authorised the levy of a police-rate from the occupiers of all houses, buildings, and lands in the town up to 3 per cent. of their annual value, or in the alternative the levy upon any land of a fixed annual rate not exceeding R1.4 per kotha. The Act also gave the Justices a discretionary power to pass, reject, or modify the Budget Estimates of the police, which were to be prepared by the Commissioner of Police and submitted to the Justices. Act IV. of 1876 transferred to the Local Government the power to pass or alter the Budget, and the Commissioners while providing funds were thus deprived of all powers of control.

In 1868, on the proposal of the Chairman, Government agreed to credit to the Police Fund all fines, other than judicial, and all miscellaneous fees realised under the Police Act (IV. of 1866), and three-fourths of the fees and penalties levied under the Hackney Carriage Act (V. of 1866), after deducting the cost of collection.

Lord Ripon's Resolution of 1881.—In 1881 Lord Ripon's famous Resolution on Local Self-Government gave new life to the agitation against the existing incidence of Police expenditure. The Resolution contained the following words: 'The Governor-General in Council would therefore be glad to see municipal bodies relieved altogether of the charges for police, and an equal amount of expenditure on education and medical charity . . . public works of local interest being transferred, with as full control as may be practically expedient over the details of expenditure.'

In 1884 the Commissioners, after carefully considering the effect of the Resolution, moved Government to relieve them of all police charges, on the understanding that a sum, based on such actual charges during the past few years, should be set aside annually from the General Fund for large town and bustee improvements, the execution of which would otherwise be beyond their resources. It was suggested that the police-rate might continue to be levied under another name, *e.g.*, the Drainage and

Town Improvement Rate. Government, while admitting the force of their arguments, was in no position to undertake new financial obligations to the extent required, but agreed with effect from 1886 to hold itself liable for one-half of the total charges—on condition that the Corporation expended $2\frac{1}{2}$ lakhs annually from the General Fund on sanitary improvements of a large and comprehensive character, the funds being obtained by increasing the house-rate.

The Commissioners demurred to any increase in the tax on rateable property, but suggested that their revenue might be augmented by some indirect taxation, such as octroi duties. Government readily appointed a Committee to examine this proposal; the Committee looked on octroi duties with disfavour, but in view of the fact that the suburbs were intimately concerned with any large schemes of improvement, proposed as a first step the amalgamation of town and suburbs, and the imposition of a duty on petroleum.

The whole question was subsequently again considered by an independent committee, which strongly recommended the removal of the burden of police charges from the Corporation, in view of its surplus resources being all required for the development of the new area, which it was decided to add to the town.

Act II. of 1888, which repealed Act IV. of 1876, did not reimpose upon the Municipality the statutory obligation of contributing to the cost of the city police, but contained a new clause, binding the Corporation to expend annually not less than three lakhs on the execution of works of sanitary improvement in the new outlying areas. A duty on petroleum stored in Calcutta, but intended for consumption elsewhere, was also authorised; the Government of India assigned to the provincial revenues a sum equal to two-thirds of the police charges assumed by the Local Government, on the understanding that petroleum stored or consumed in Calcutta should not be subject to local taxation, if subject to an Imperial customs duty.

Under section 206 of the current Act, corresponding

to section 99 of Act II. of 1888, the obligation to obtain the sanction of the Local Government to a petroleum tax, practically debars the Corporation, in view of the history of the question, from imposing a local tax on this commodity, unless the Imperial customs duty is first abolished.

Since the passing of Act II. of 1888, the Corporation has been exempt from all liability to contribute to the cost of the city police.¹

2. PROTECTION AGAINST FIRES

Early Measures.—In 1780 it was enacted that huts should not be built of inflammable materials, but the law appears to have been repealed in the following year. The Committee appointed by Lord Wellesley in 1803-4 directed attention to the frequent fires in Calcutta, and suggested means for their prevention. Nothing however was done, and the question was next raised by the Fever Hospital and Municipal Enquiry Committee, which, at the request of Government, inquired into the matter through one of their sub-committees in 1837. The need for remedial measures was great, for Calcutta in its early days was notorious for the number and extent of its fires, which swept like whirlwinds across its dense blocks of straw huts. In 1780 we hear of numerous fires, in one of which 15,000 straw hovels were consumed and 190 people burned to death. Incendiarism was an easy matter and of frequent occurrence.

The Sub-Committee found the number of huts in Calcutta to be 48,049, of which almost two-thirds had straw roofs and mat walls.

No less than 7174 huts, along with much other valuable property, were estimated to have been destroyed by fire in the first four months of that year (1837). In Madras the erection of straw-roofed huts had been long prohibited—in Bombay since 1805, when a fire lasting three days swept through the city.

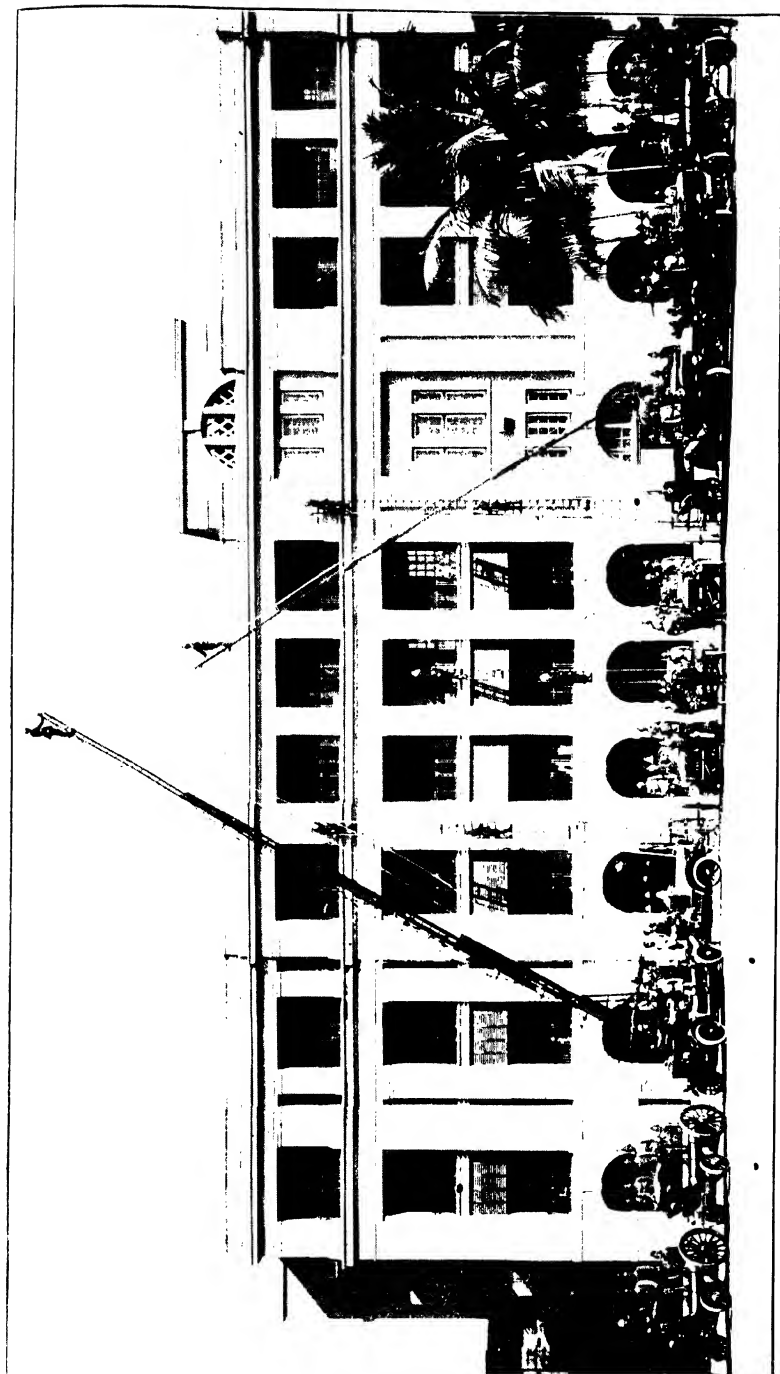
¹ A list of the Calcutta Police Stations will be found in the *Corporation Almanac*, p. 44.

In accordance with the recommendations of the Committee, Act XII. of 1837 was passed, making it compulsory for the owner to cover every house or outhouse, erected after the 1st November 1837, with a roof of incombustible material, the Superintendent of Police being authorised to defray the cost at his discretion in the case of huts built before the 1st November 1837. The measure appears to have been attended with beneficial results, but a disastrous fire occurred in 1852, and led to the Commissioners being given powers by Act XIV. of 1856, to prevent huts or other buildings being roofed with inflammable materials. All later legislation contained provisions directed towards the same object. Jute warehouses were soon found to be only less dangerous than thatched houses, and they were brought under regulation by Act VI. of 1866.

Every jute store or warehouse existing at the passing of this Act became liable to registration, while no premises were to be newly used for this purpose unless a license had first been taken out. Similar provisions were already contained in Act VI. of 1863 in respect of depots used for other inflammable substances.

Fire Engines.—The Police Commission of 1822 made some inquiry into the establishment maintained by Government for extinguishing fires. In 1837 there was an establishment of two European constables and 134 menials (chiefly *khalasis* and *bhistis*); the staff cost Rs740 a month during the dry season, and in the rains, when it was greatly reduced, Rs203 a month. In the event of a fire breaking out amongst straw-roofed huts, the engines, we are told, usually arrived too late to have any beneficial effect, while fires amongst brick-built houses were rare.

In 1861 the cost of the Fire Engine establishment was transferred to the Municipality, the annual charges then amounting to about Rs6200. In 1865 five new fire-engines were imported from England, of which three were drawn by horses, the others being of a smaller type designed for use in narrow gullies. They worked admirably where there was an adequate supply of water, but



Picture by Bourne & Shepherd, Calcutta

it was not until ground hydrants were introduced that a strong and constant supply became available.¹

Jute Warehouse Act II. of 1872.—In 1871 extensive premises used as jute warehouses in Darmahatta and Armenian Streets were burnt down, and influential representations were made to the Justices urging the adoption of measures for the better regulation and control of all depots for unscrewed jute and cotton, and the necessity of placing the Fire Brigade on a more efficient footing. A special committee reported on the subject, and the Justices then moved Government to frame an Act

- (1) Prohibiting the use of any place for the storage of unscrewed jute, cotton, or similar commodities, unless such place were duly licensed for the purpose ;
- (2) Providing that any place already licensed in this behalf under Act VI. of 1866 should be liable by a judicial proceeding before a Magistrate, to have its license cancelled or suspended ;
- (3) Providing for the issue of licenses and the maintenance of an inspecting agency by the Justices ; and finally
- (4) Requiring the municipalities of the town and the suburbs to organise and maintain through the Commissioner of Police or other agency an efficient Fire Brigade.

These business-like recommendations were embodied in the Jute Warehouse Act of 1872, their stringency being somewhat increased in view of a disastrous fire which had just occurred in Clive Street.

Under the Act a committee of the Justices, assisted by an establishment of three inspectors, each on Rs150 per mensem, was appointed to inspect all jute warehouses, while a Fire Brigade was organised in consultation with the Commissioner of Police. The Justices decided that the control of the Fire Brigade, which was vested in them, should be delegated to the Commissioner of Police, that an initial expenditure of Rs13,812 and

¹ See Appendix I.

a recurring annual expenditure of Rs15,134 should be sanctioned, and that fire-stations should be established at

- (1) The Police Office,
- (2) Tollah,
- (3) Palmer's Bridge,
- (4) Bhowanipore, and
- (5) Watgunge.

There were seven engines, of which the two worked by steam-power were stationed at the Police Office.

Amendment of Act.—Act II. of 1872 and two amending Acts (II. of 1875 and I. of 1877) were consolidated by Act V. of 1879, of which the main object was to relieve the jute trade from some of its burden of taxation. The new Act included Calcutta, Howrah, and the suburbs within its scope ; it laid down definite principles for the grant of licenses, and transferred the organisation and maintenance of the Fire Brigade to the Commissioner of Police. In 1893 the Licensed Warehouse and Fire Brigade Act, which is still in force, divested the Commissioners of all responsibility for the control and administration of the Fire Brigade, and relieved them from the duty of inspection and supervision of warehouses ; they were however still required to levy and collect the fees and to grant licenses, which are issued as a matter of course on the advice of the Commissioner of Police. The Jute Department, which had been maintained as a branch of the License Department, was accordingly abolished. One inspector was however still maintained for the assessment of the fees, until the reorganisation of the License Department in 1903-4, when this post was also abolished, and its duties divided amongst the ordinary inspectors of the Department.

Fire Brigade Fund.—Under Act II. of 1872, the cost of the Fire Brigade was made a charge on the Calcutta and Suburban Municipalities.

In addition to the fees levied upon the jute merchants, a rate was realised from the Fire Insurance Companies, calculated upon the amount of premia received by them. The amount raised by these means was large enough to

enable Government between 1872 and 1881 to expend more than 1½ lakhs of rupees out of the surplus of the Fire Brigade Fund on works of public improvement.

The Act of 1879 moderated the severity of the assessments by increasing the number of taxable materials. It also abolished the contributions exacted from the Fire Insurance Companies.

Under this Act the Jute Warehouse Fund was established, to be applied by the Town and Suburban Commissioners for (1) the maintenance of a joint Fire Brigade for Calcutta and the suburbs, and a separate Brigade for Howrah, and (2) for the payment of all expenses incurred on the inspection and superintendence of jute warehouses and the issue of licenses.

The surplus, if any, was to be applied for the reduction of fees. A repealing Act (IV. of 1883) provided for 20 per cent. of the receipts being paid to the Commissioners for their warehouse establishments, the remaining 80 per cent. being made over to the Commissioner of Police for the upkeep of the Fire Brigade.

In 1890 the Bengal Chamber of Commerce protested against the unfair incidence of the taxation, the fees being paid almost entirely by one industry—jute.

Government appointed a strong committee to consider the question, and ultimately, after a long controversy, the Act of 1893 was passed. It limited the amount to be derived from license fees¹ to 50 per cent. of the annual cost of the Fire Brigade, the other half being defrayed from municipal revenues. It reserved to the Local Government the power to apportion the cost between Calcutta and the suburbs.

The Act made no provision for meeting the cost of the establishment, through which licenses were issued and prosecutions conducted. As it was held that the Municipal Act did not authorise the expenditure of municipal revenues for this purpose, an annual contribution of Rs1500 was made by Government, the amount being raised in 1905-6 to Rs3000.

¹ The tax is levied at the rate of 10 per cent. on the annual valuation of licensed warehouses.

3. MISCELLANEOUS SERVICES

Ambulances.—Public ambulances were first provided by the Municipality in 1898 during the first great plague scare. Two heavy ambulances—subsequently converted into funeral hearses for those who had died from plague—were purchased, and some *palkis* which were kept at the Police Stations, and used for the removal of small-pox and cholera patients. Later on thirty two-wheeled ambulances of a Bombay pattern were provided, but their use was discontinued on one being broken up in a plague riot.

In 1903 a Committee appointed by Government on the recommendation of the Inspector-General of Civil Hospitals, recommended that ambulance vans of a modern type¹ should be kept up by the Municipality. The Commissioners adopted the suggestions of the Committee, and also decided to keep small ambulances at each tramway depot, to be used in rendering 'first aid'; effect was however apparently not given to the latter resolution. Six English-made ambulances were purchased at a cost of Rs1881, of which half was contributed by Government, and a horse ambulance and four hand litters were locally made, at a cost of Rs2200. These eleven ambulances were kept at the Police Stations, and intended exclusively for use in street accident cases.

In 1906 six litters for use in cases of infectious disease were purchased at a cost of Rs1600 and made over to the police, who remained responsible for the actual removal of the patients. The small-pox epidemic of 1909 placed a severe strain on the police, and in 1911 it was decided to relieve them from all such responsibility, to reserve the horse ambulance for infectious cases, and to station it at District III. (Gowkhana), and to keep the hand-wheeled ambulances at the hospitals.

The existing arrangements¹ are as follows :—

- (1) Ambulances for use in infectious cases are kept at all the leading hospitals ; the old horse ambulance

¹ In 1914-15 the purchase of three motor ambulances at a cost of Rs10,000 each was sanctioned.

was made over to the police, and a new vehicle of superior make is stationed at Gowkhana III. for accident cases.

- (2) Six 'viaduct' ambulances and several litters of a light pattern are kept at the Police Stations for accident and other emergent cases.

Destruction of Stray Dogs.—Act XII. of 1852 contained express provision for the killing of stray dogs. In 1854 no less than 18,000 were destroyed. Subsequent Acts authorised the expenditure of municipal funds on measures adopted for the public safety in general. An annual expenditure of about Rs500 is incurred by the Commissioner of Police, in arrangements made for destroying stray dogs, the cost being refunded to him by the Corporation.

In 1911 no less than 12,509 such animals were destroyed.

(b) LAW AND JUSTICE

Position of Justices.—Prior to the statute 33 Geo. III. c. 52, the only Justices of the Peace in Bengal were the Governor-General, the Members of Council, and the Judges of the Supreme Court. Under the Statute the Governor-General in Council was authorised by commissions issued under the seal of the Supreme Court of Judicature to appoint qualified persons as Justices of the Peace, with the principal duties of arranging for the cleansing, watching, and repairing of the streets, and of making assessments for these purposes. The Justices were also authorised, as we have seen, to grant licenses for the sale of spirits within the town. The Statute makes no more precise or definite statement of the functions and status of the Justices, but under the old English statutes, from which the Indian institution was borrowed, a Justice of the Peace was concerned more with the administrative business of a town than with the discharge of magisterial functions. With the passing of the Local Government Acts, the former duties, however, have in the United

Kingdom been almost entirely transferred to the elective authorities.

The Justices of the Peace who were appointed under the Statute of 1793 were not empowered to hold 'any court of oyer and terminer and gaol delivery,' nor to sit in any 'such court, unless the Justices of the said Court shall, on any particular occasion, call upon them to do so,' in which case they sat as Justices of the Court, and had a deliberative voice in the proceedings. By 1837 their chief duty was to exercise judicial control over the assessors, and to hear and decide appeals against assessment; the administrative control of the Assessment Department and the disbursement of the town funds had passed into the hands of the Chief Magistrate, who with his subordinates constituted what was a purely Government department. The practical supersession of the Justices in all matters of administration was clearly resented by some of their body; one of them, Mr. C. K. Robison, who was also a Stipendiary Magistrate, was 'of opinion that the whole Conservancy duties ought to be performed by the Magistrates, *each in his own Division*,'¹ and before the Fever Hospital Committee he made the following complaint:—

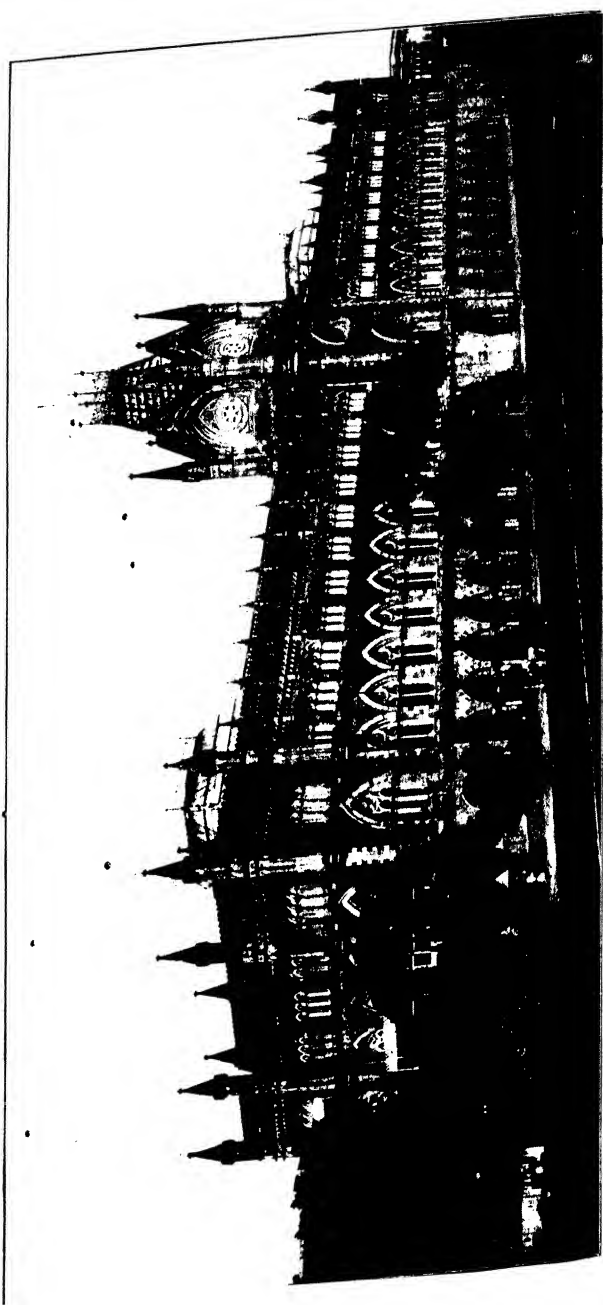
'At present I am directed not to execute the powers given me by Acts of Parliament, and am expected to act in constant violation of the law; I trust that is not to continue; in truth eleven-twelfths of what I now do is illegal. I never however join in legalising the assessment, as the disbursement is taken out of my hands, and I ought not to be responsible for the expenditure of others.'²

By 1837 the Chief Magistrate, under Government, was in supreme control of the Police and Conservancy, and he also tried municipal cases instituted by these departments.

The Acts passed between 1840 and 1863—in particular

¹ The italics are mine.—S. W. G.

² Mr. Robison no doubt speaks *qua* a Town or Stipendiary Magistrate rather than in his capacity of Justice, but the ultimate basis on which his claim to a share in the administration rested was the Statute of 1793.



Act X. of 1852, under which a thorough reorganisation of the police force was effected—conferred large judicial powers on the Justices ; almost all municipal cases instituted under Act VI. of 1863 came to their tribunals. Under Act IV. of 1876, the Justices were superseded by the Commissioners, and following the precedent of the Justices, those Commissioners who were also Honorary Magistrates continued to try what may be roughly termed municipal cases.

The practice was however discontinued in 1881, when the High Court expressed the opinion that such cases should not be tried by a Municipal Commissioner. From that time these cases began to be heard by the Presidency Magistrate, assisted by Honorary Magistrates, who were not Municipal Commissioners.

In 1885-86 an attempt was made to avoid a too frequent resort to legal proceedings by the appointment of what was termed a 'Conciliation Tribunal,' consisting of three Commissioners selected by the Town Council. It was arranged that any aggrieved person might appeal to this tribunal, which of course possessed no legal authority, provided he undertook to abide by its decision. The idea however proved of no practical value, and the tribunal had but a brief existence.

Stipendiary Magistrate.—Municipal cases for the most part continued to be disposed of by benches of Honorary Magistrates sitting in the Calcutta Police Court, and also after the amalgamation of the suburbs in the courts at Alipore and Sealdah. The cost of establishment was defrayed from municipal funds. In 1901 a Stipendiary Municipal Magistrate was appointed under the provisions of Act III. of 1899, for the trial of offences against the Act, and the rules, bye-laws, and regulations made thereunder. He exercises the powers of a Presidency Magistrate, though it has been recently decided that he has no power to pass any sentence of imprisonment. His salary is paid from municipal funds, and until 1907-8 the Corporation paid also the cost of his establishment and the contingent expenditure of his Court.

The question of liability for these latter charges was

in that year raised by the Vice-Chairman of the Corporation, and the opinion of the Advocate-General being in favour of the Corporation, the Local Government accepted liability for the charges in future, and in 1909-10 refunded the sum of Rs57,024, being the entire amount hitherto realised from the Municipality.

Municipal Pleader.—In 1885-86 a qualified Pleader, on a salary of Rs150 a month, was appointed to assist the municipal officers in conducting their more difficult cases ; and in 1889 a Pleader, on a pay of Rs100 a month, was appointed for the same purpose in each of the suburban courts (at Alipore and Sealdah).

In 1892 it was decided that no civil suits, except those necessary for the recovery of the dues of the Corporation, should be instituted or defended without the previous sanction of the General Committee, and in 1894 such sanction became necessary for the employment of counsel or attorney in land acquisition proceedings. Between 1901 and 1905, when the legal work of the Corporation was entrusted to Messrs. Sanderson and Co., the offices referred to above were abolished, but they were revived in 1905 on the establishment of a Municipal Law Department, and two more Pleaders were also appointed to appear in the Small Cause Court and the Municipal Magistrate's Court.

Working of Municipal Magistrate's Court.—The number of prosecutions shows a steady increase from year to year ; in 1913-14 no less than 22,043 cases were instituted, being the highest on record. It must be admitted that placing laws upon the statute-book and the promulgation of bye-laws is in India a much less laborious task than enforcing them ; the number of prosecutions is no guide to the approximate number of offences, but is merely valuable—in comparison with former years—as an index of the activity or apathy of the municipal staff. In 1913-14 convictions were obtained in 18,763 cases out of 23,381 cases actually tried in that year. The total amount of fines imposed was Rs1,01,169.

CHAPTER IX

MARKETS, SLAUGHTER-HOUSES, AND DHOBIKHANAS

Sir Stuart Hogg Market.—The glaring defects of the markets of Calcutta did not escape the searching scrutiny of the Fever Hospital Committee, but it was not until the new constitution of 1863 was granted that the Municipality attacked the question of market reform. The two largest markets at this time were Tiretta Bazaar and the Dharamtola Market.

The latter, situated at the junction of Chowringhee and Dharamtola Street, belonged to Babu Hira Lal Sil, one of the wealthiest men in Calcutta. The market was surrounded by houses on all sides, its accommodation was quite inadequate to the crowds which frequented it, and its ventilation and conservancy arrangements were most defective. The exactions of the *amla*, moreover, and the exorbitant rents demanded from the vendors, had the effect of raising the prices of provisions, and in 1863 a representation on the subject was presented to the Government of Bengal signed by many European residents of the town. The municipal Conservancy Committee at the proprietor's request formulated its suggestions for the improvement of the market, but no improvements were made. The proposals of a private company to found a new market, which might lead to healthy rivalry, also fell through. The time was thus ripe for the establishment of a municipal market, conducted on hygienic and business-like principles.

On the 16th January 1866 the Justices resolved to allot a lakh of rupees for this purpose, the consent of Government was obtained, and a site at the corner of Grant Street and Corporation Street was selected.

It soon appeared however that nothing short of 2 lakhs would finance the project, and this difficulty, reinforced by some dislike to 'municipal trading,' proved fatal.

In October 1868, on the motion of Mr. James Wilson, the Justices appointed a Committee to examine into and report upon the condition of private markets in the city. The committee advocated legislation to enable more effective control to be exercised over these markets, and also revived the proposal for establishing a municipal market. Mr. Wilson's motion, however, to found a municipal market was rejected by the Justices in November 1868. In December 1870 Sir Stuart (then Mr.) Hogg again brought the question into prominence, and a special committee appointed to consider the practicability of establishing a market, reported in favour of the proposal in 1871, but suggested that the Dharamtola Market might be purchased for about 6 lakhs; failing this, a new market might be constructed between Corporation Street and Lindsay Street, legislation being undertaken to give the Justices the necessary powers and to enable the required capital to be raised by the issue of debentures. The Calcutta Markets Act (VIII. of 1871), which provided also for the control and regulation of private markets, was subsequently passed, authorising the Justices to raise a loan of 6 lakhs for the construction of a market.

The bonus of Rs1000, which was offered for the best design, was awarded to Mr. R. R. Bayne, Architect to the East Indian Railway Co., and the building, commenced in September 1871, was completed and the market formally opened in 1874. The contractors, Messrs. Burn and Co., were paid a lump sum of Rs2,58,720.

An area of 25 bighas, of which some surplus land was subsequently sold, was acquired at a cost of Rs2,18,000.

Stability of the Market Secured.—It is common knowledge that in India the construction of a market is by no means the only costly step. The Justices immediately found themselves committed to a bitter contest with the rival market in Dharamtola.

Its *daroga* or rent-collector exacted agreements from

many of his tenants, binding them not to leave him for a period of five years, while many of them voluntarily agreed to stand by the Dharamtola market to the end.

The butchers however, led by one Abdul Ghus, a wealthy and influential member of their body, stubbornly refused to place themselves at the mercy of the *daroga*, who then took the injudicious step of ejecting two of the opposition from the market.

His action was the signal for a revolt, and the butchers left Dharamtola in a body in December 1873, and obtained temporary accommodation near the municipal market from the Chairman of the Justices, until the new building was ready (1st January 1874) to receive them. They were accompanied by the principal fishermen, headed by one Bisanath Coondoo, and the new market thus at the very outset secured two most important classes of supplies. The war, however, between the rival markets continued, and it was at last recognised that some amicable settlement must be reached, and an end put to the unedifying struggle between a powerful corporate body and a private enterprise.

In February 1874 it was decided, after a heated debate, to acquire the Dharamtola Market at a cost of Rs7 lakhs—the amount fixed as the result of negotiations between the owner and the representatives of the Justices—and to obtain the amendment of the existing law¹ to enable the proposal to be carried out.

This market was for some time after its acquisition kept open by the Municipality, but during the years 1887-91 the property was divided into twenty-two lots, and sold by public auction for Rs5,40,900.

The prosperity of the Sir Stuart Hogg Market has steadily grown, while its expanding scope and usefulness have made it the pride of the Municipality; the Commissioners may justly claim that it is not only one of their most valuable assets, but also one of the most magnificent public markets of which any municipality can boast.

¹ In passing Act II. of 1874, the opportunity was taken to provide legal sanction for the payment of 'advances' to the tenants—an item of expenditure which is inevitable in founding new markets in India.

In 1903-4 the income was Rs2,26,808 ; ten years later it had increased to Rs3,92,781. The total cost of the new market, including the amount paid for the Dharamtola Market and also interest on loans during construction, cost of fittings and advances made to vendors, was about 14½ lakhs of rupees, and in 1882-83 Sir Henry Harrison calculated that this outlay, taken merely in the light of an investment, was 'yielding an income of about 5½ per cent. on capital borrowed at 6½ per cent.'

The re-sale of the Dharamtola property for about 5½ lakhs, and on the other hand the investment of more capital in recent extensions to the market, have altered the financial aspect of the undertaking, and the *net profit after* allowing for charges of management, repairs, renewals, interest, and sinking fund, amounted in 1913-14 to nearly 1½ lakhs a year.

Additions to the Market.—In the years 1883-85, 1895-97, and in 1903-4, additions and alterations to the Market were made at a cost of Rs1,57,000. Increased accommodation was however still necessary, and in 1907 a comprehensive scheme for extending the market on the east side, at a cost of Rs11½ lakhs, was taken in hand. Of this amount, Rs4,76,999 were expended in the acquisition of about 6½ bighas of land, while the buildings, constructed by Messrs Marten and Co., and completed in July 1909, cost Rs5,77,947. The extension included two handsome ranges for the sale of meat, fish, and poultry, a number of single shops, and quarters for the staff.

The opportunity was taken for a complete rearrangement of the market, different portions being reserved for the sale of the different classes of food supplies and other commodities ; the rents were also revised on definite principles, based on the size and position of each stall or shop. The additions added 58 units to the shops and 470 units to the stalls, and about a lakh of rupees to the revenue. Considerable extensions were subsequently considered necessary and were completed in 1914-15. A new range for the sale of live and dead poultry, birds, and game was constructed to the east of the main build-

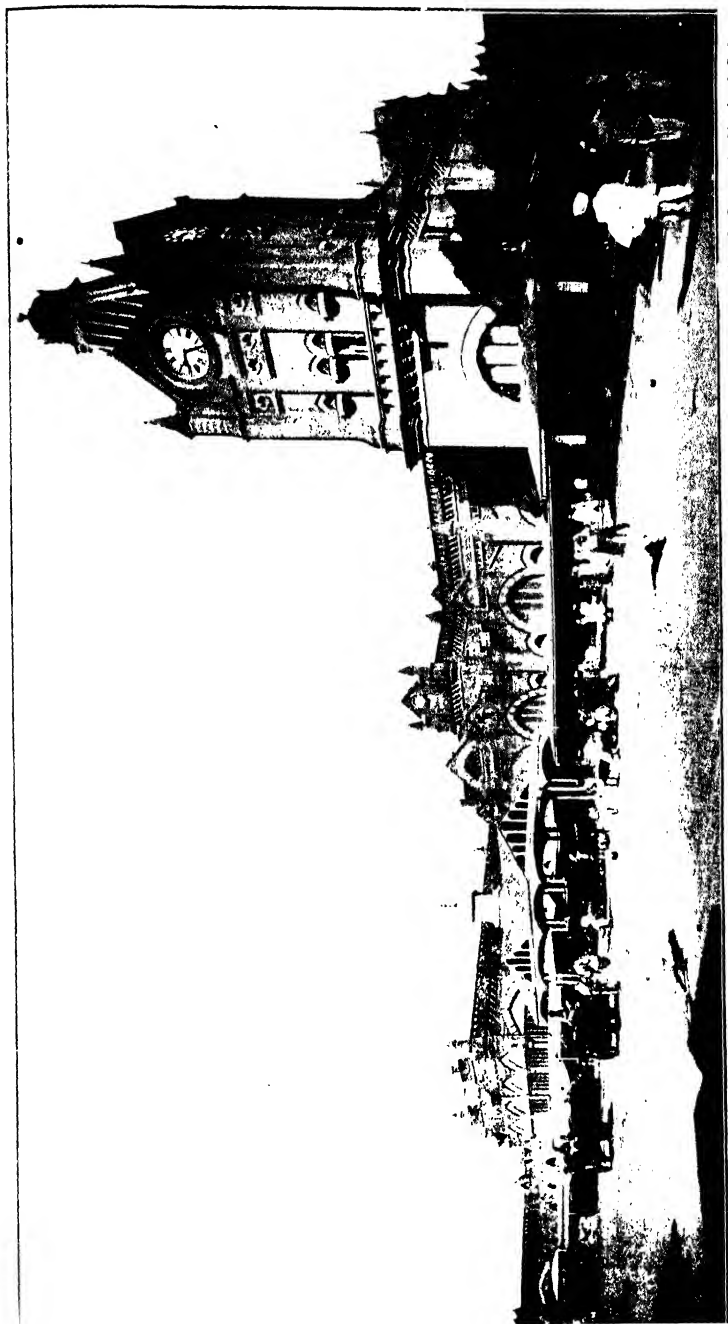


Photo by L. J. Bourne & Son, London, England

ing and separated from it by a road ; the virtual segregation of this important trade with its own peculiar aroma and parasites, has obvious advantages. The cost of the land (already acquired), building, and its adjuncts was Rs2,72,851. The northern extremity of the market was improved by a façade and linked up with a new 'squatters' shed'—a range constructed for the sale of fruit and vegetables by the growers to the public or to the market stall-holders. The 'squatters' shed,' which cost originally Rs27,908, was opened on the 1st November 1912, and extended in 1914 at a cost of nearly Rs28,000. A portion of the main building, known as Block B, which had been destroyed by fire in the previous year, was rebuilt on a greatly improved design, with fireproof stalls fitted throughout with electric light. The cost amounted to Rs1,27,117, but the capitalised value of the *additional* stallages obtained, and the 'initial rents' or registration fees received from new tenants, exceeded the cost of the new building, so that the fire actually resulted in a profit to the Corporation. The capital account of this splendid market on 31st March 1915 amounted to over Rs25 lakhs, and the income it produced in 1914-15 was over 4 lakhs.

Transfer Fees.—The Corporation had always reserved the right to allow or veto the transfer of tenancies, and in 1894 it was decided to levy a transfer fee, equal to two months' rent, from any tenant wishing to sublet his shop or stall. In 1899 this system was abolished, as it was thought that the public sale of holdings which tenants wished to relinquish would be much more profitable.

The result was a great increase in the number of secret or unauthorised transfers, and in 1906 the fee system was again introduced, a sum equal to three months' rent, and called a registration fee, being levied where the registered tenant desired to sublet or change his trading name.

In 1913 an investigation was made into the practice of secret or *benami* transfers, which led sometimes to the acquisition by one man of several stalls supplying the

same commodities, the monopoly thus created leading in its turn to an artificial rise in prices.

It was decided to recognise the men actually in possession as tenants of the Corporation, and to register them as such, but that in future no transfer of tenancy should be recognised except by permission, and that all partnerships or changes of ownership should be registered, a fee equivalent to ninety days' rent in the case of stalls, and three months' rent in the case of shops, being ordinarily charged for any such change of tenancy.

Registration of Coolies.—In 1885-86 the annoyance caused to customers by importunate coolies led to a scheme for registering every coolie plying within the market ; a registration fee of 5 annas was charged, and each coolie was required to wear a simple uniform and a number badge. A staff of ten peons was appointed to supervise them, and bye-laws on the subject were passed.

New bye-laws were framed in 1910 (Government notification No. 1716 M, dated December 26, 1910), and the coolies are now well controlled ; the registration fee was raised to Rs3 a year.

Supplies of Market.—From its opening in 1874 the market has continuously provided a large section of the Calcutta public with abundant supplies of fish, meat, poultry, fruit, vegetables, milk, butter, eggs, cheese, and other fresh food-stuffs, except for brief periods when the normal sources of supply have been affected by famine or scarcity, or when the famine measures of 1898 caused a panic and an exodus from the city, in which many market tenants joined, or when some grievance, real or imaginary, has found its safety-valve in a strike, never—so far—protracted beyond a day or two. The market however is not merely a depot for the sale of fresh food-stuffs ; within its attractive ranges will be found orderly lines of stalls comprising most of the trades which supply the secondary wants of civilised man ; booksellers, florists, ironmongers, grocers, drapers, tailors, saddlers, stationers, tobacconists, and a multitude of other vendors ply their busy trades within the great emporium, which owes its name and in large measure its survival through the

dangers of infancy to Sir Stuart Hogg, one of the most distinguished Chairmen of the Corporation of Calcutta.

Markets Committee.—The steady development of the market must be attributed in no small degree to the labours of this Committee, constituted on the 15th January 1874 to assist and advise the Chairman in all matters connected with its management. In the negotiations with the proprietor of the Dharamtola Market, in the framing of the Bill for the better regulation of private markets, in the improvement of Lindsay Street, in the character of the successive market extensions, and in important matters of internal management and supervision, arrangement of stalls and a multitude of other essential details, on which the success of this big enterprise has depended, the Markets Committee has rendered service which is too well known to require eulogy, even if appreciation or criticism were not foreign to the purpose of this work.

Weights and Measures.—Provisions to secure the use of standard weights and measures and their periodic verification were first enacted ¹ in the Municipal Act of 1888, and a sub-committee was appointed in 1889 to recommend measures for giving effect to the new sections. The Market Superintendent was supplied with a brass yard-measure, certified under the authority of Government, with standard weights from the Mint and with accurate scales costing in all over Rs1000; a verification fee was fixed under the Act, and the Superintendent was appointed verifying officer. The results however appear to have been meagre, and the matter seems to have been lost sight of.

In 1902 the Commissioner of Police drew the attention of the municipal authorities to the malpractices of certain shopkeepers of Kalighat in using short weights; the Corporation however were not empowered to enforce the production of weights and measures used by shopkeepers of the town, and Government was addressed with the

¹ A Government Resolution of 1830 drew attention to the need for such provisions.

idea of having some action taken under the Police Act.¹ Government was not convinced that any action was necessary, and the matter remained in abeyance until 1910, when the Corporation appointed a special committee to reconsider the whole question. On their recommendation Government was asked to extend the scope of section 559, clause 38, of the Municipal Act (III. of 1899) so as to enable bye-laws to be framed preventing the use of false or defective weights, scales, or measures, *in any place*² used for the sale of any article of food or drink, drugs, or any other goods throughout the town, and there the matter stands pending the amendment of the Act.

Lansdowne Market.—Amongst the general improvements effected in the suburbs after their amalgamation with the town in 1888 was the establishment of a new municipal market. A suitable site was found in surplus land acquired in Lansdowne Road, and Messrs. Burn and Co.'s tender for the construction of the building, at a cost of Rs40,500, was accepted in 1902. The market was opened to the public on the 15th October 1903, and a good supply of food-stuffs was secured.³ Its apparent prosperity was however of brief duration; private competition was strong, and the middle classes, whose custom it had seemed easy to secure, preferred to rely on the more ample and varied supplies of the Sir Stuart Hogg Market. In 1904 the Superintendent was given a sum of Rs600 to expend on the popularisation of the market; the fish vendors were temporarily exempted from the payment of rent and the license tax. Between 1904 and 1906 proposals to lease the market were considered but in the end rejected, an offer of an annual rental of Rs3000 for a ten years' lease being considered inadequate.

In 1912 an attempt was made to extend the market,

¹ Viz., under section 56 of that Act (IV. of 1866).

² Clause 38 of section 559 authorises the framing of such bye-laws only in respect of *markets*.

³ A Superintendent on Rs300 per mensem was at first appointed, but in October 1904 economies were seen to be necessary. This post was abolished, and a Clerk (Rs50-65) was placed in charge under the general supervision of the Superintendent of the Sir Stuart Hogg Market. In 1912 the post of Clerk was abolished, and a Veterinary Assistant placed in charge both of the market and the slaughter-house, which had been newly opened.

and thereby render it more attractive, by adding two lines of shops constructed after an inexpensive design. The work was completed in 1913-14 at a cost of Rs3398. It seems likely that this market, which opened with a blare of trumpets and almost immediately collapsed like a house of cards, will now gradually work itself into favour, although its development has been extremely slow, the interest charges as yet being far from defrayed from the revenue.

The following statement shows the market receipts since its foundation :—

1903-4	.	.	.	.	Rs1230
1904-5	.	.	.	.	1040
1905-6	.	.	.	.	850
1906-7	.	.	.	.	1496
1907-8	.	.	.	.	1411
1908-9	.	.	.	.	1725
1909-10	.	.	.	.	2010
1910-11	.	.	.	.	2121
1911-12	.	.	.	.	2377
1912-13	.	.	.	.	3122
1913-14	.	.	.	.	3906
1914-15	.	.	.	.	4230

Allen Market.—In 1904 the Markets Committee unanimously resolved that it was desirable to establish a municipal market in the northern portion of the town, but there was great diversity of opinion on the question of a site. Premises No. 119 Upper Chitpore Road—where the old Bartola Tank had been filled in—belonged to the Corporation, and was valued at Rs51,374. It was decided to utilise this land for the purpose, and the new market was constructed here in 1909-10 at a cost of Rs37,296 by the contractor Babu Kali Sankar Mitra. It was opened to the public on the 25th August 1910, and was named after Sir Charles Allen, Chairman of the Corporation from 1905 to 1909.

The market is a two-storeyed building, with twenty-eight shops on the ground floor; there is also a roofed *chandney* for the sale of fish, meat, and vegetables.

The career of the Allen Market, at first promising

success which rapidly turned to failure, has much in common with that of the Lansdowne Market. A market—whether large or small—built in accordance with modern ideas of sanitation and hygiene is necessarily costly, and the recoupment of the outlay which these modern ideas demand can hardly be anticipated, unless the enterprise is on a large scale.

Lansdowne Market is capable of extension and may have a future; the Allen Market, on the other hand, is debarred from expansion. It may at some time yield a revenue that will cover working and loan charges; it can never be a valuable municipal asset nor of important public utility. The market was at first placed in charge of a superintendent on small pay, with a clerk and sirkar to assist him. In 1912 a more experienced officer was placed in charge on a pay of Rs400 a month, and during the eighteen months of this appointment the market revenue showed some improvement, although it was exceeded by the cost of management, to say nothing of the loan charges. In 1913 it was decided to employ a cheaper agency for working the market, and the charges under this head now amount to under Rs250 a month, while the income is more than double as much. Over Rs5000 has however been recently added to the capital cost, viz., Rs3078 expended in 1911-12 in improving the water supply and in small structural alterations, and Rs2467 expended in 1912-13 in providing some additional accommodation. In 1911 and 1913 the expediency of making over the market to a private lessee was considered, but the suggestion was finally rejected.

The following statement shows the income and working charges of the market :—

Year.	Income.	Expenditure (excluding loan charges and cost of improvement works).
1910-11	Rs1240	Rs830
1911-12	2746	2934
1912-13	4479	7633
1913-14	5346	5090
1914-15	6794	2860

The original capital cost plus the cost of improvements amounts to Rs94,210 ; thus the surplus of income over expenditure already yields almost $4\frac{1}{4}$ per cent. on the capital outlay.

Project for New Municipal Market in College Street.—In 1905 Sir Charles Allen advocated the establishment of a municipal market in the northern part of the city ; it was estimated that about $10\frac{1}{2}$ bighas of land might be acquired in Machua Bazaar Road at a cost of Rs4 $\frac{3}{4}$ lakhs, and that the building would cost about Rs4 $\frac{1}{4}$ lakhs. The scheme however was ultimately whittled down to the tiny market at 119 Upper Chitpore Road, which by its very exiguity was incapable of fulfilling the purposes for which it was founded. In April 1913 Dr. Dutt, a Municipal Commissioner, urged the Corporation to grasp the golden opportunity presented by the acquisition of a large private market in College Street, known as Madhab Babu's Bazaar,¹ for the purposes of the Calcutta University, which intended to construct new buildings on the site. Dr. Dutt proposed that a municipal market should be without undue delay constructed in that vicinity on some suitable site, to which the tenants and business of the bazaar might be transplanted before it was entirely dismantled. A committee was appointed to draw up a scheme, if it should decide that the need for a new municipal market could be established. Their exhaustive report provided the Corporation with ample material for coming to a decision, and the proposal to acquire about 9 bighas of land in College Street, at an estimated cost of Rs7,08,000, and to construct a market thereon at a cost of nearly Rs5 lakhs, met with the almost unanimous support of the Commissioners. The scheme was sanctioned by the Local Government in May 1914, and acquisition proceedings were initiated. By October 1915 over 7 bighas of land had been acquired, at a cost of about Rs5,90,000 ; it is possible that the rest of the land included within the original scheme may be found to be

¹ In 1892 a committee was appointed to consider a proposal similar to that made in 1905 ; it was suggested (in 1892) that Madhab Babu's Bazaar should be acquired and rebuilt, but the scheme fell through.

unnecessary. The tender of Babu Kali Sunker Mitter, for Rs1,80,941 for constructing a portion of the building, has been accepted by the Corporation and approved by Government. The market has been designed in the Indo-Saracenic style by the City Architect.

Private Markets.—It was not until 1863 that the Corporation addressed itself seriously to the improvement of the private markets of Calcutta, of which the Fever Hospital Committee had remarked many years before that there were ‘few, if any of them . . . which are in a state such as ought to be permitted in any well regulated city, and more especially in a climate like this.’

Almost all were said ‘to be offensive to the neighbourhood’; there was no *pucka* flooring nor *pucka* drains, and the provisions were generally bad. The Committee were impressed by the need of proper supervision and inspection by the town authorities.

In 1864 bye-laws were passed providing that all markets should be kept cleanly and provided with proper sanitary conveniences; obstructions to the public thoroughfares were to be prevented, and the sale of unwholesome food-stuffs checked. The owners of markets bitterly resented this attempt at municipal control, but the Justices persisted, and Act VI. of 1866 gave them increased powers.

Notices were issued on the owners of the principal markets to carry out some very necessary improvements, and in many cases obeyed. The owners of the Dharamtola and Tiretta Markets gave difficulty, but the former property was finally acquired by the Corporation, while the latter was much improved in 1869. The Committee appointed in 1868 to inquire into the state of the private markets, reported that in order to make their control effective more ample powers should be given to the Justices, in particular the power to grant or refuse licenses for markets.

Act VIII. of 1871 required that all markets satisfying certain conditions should be registered within six months of the passing of the Act; all other markets were to be regarded as new foundations, which were only to be

granted licenses on certificates granted by the Health Officer.

LIST, A.

- (1) New Bowbazaar (closed).
- (2) Madhab Dutts Bazaar.
- (3) Nutun Bazaar.
- (4) Posta Bazaar.
- (5) Dhurumtala Bazaar (closed).
- (6) Simla Bazaar.
- (7) Amherst Street Bazaar.
- (8) Grant Street Bazaar.
- (9) Collinga Bazaar.
- (10) Mullick Bazaar.
- (11) Tiretta Bazaar.
- (12) Rani Posta Bazaar.
- (13) Bow Bazaar.
- (14) Lal Babu's Bazaar.
- (15) New Baitakhana Bazaar.
- (16) Sobha Bazaar.
- (17) Machua Bazaar.
- (18) Raja Posta Bazaar.

Eighteen markets or bazaars enumerated in the marginal List A were registered under the Act.

LIST B.

- (1) Hill's Bazaar.
- (2) Chuni Babu's Bazaar.
- (3) Pora Bazaar.
- (4) Tiktiki Bazaar.
- (5) Hatkhola Bazaar.
- (6) Sham Bazaar.
- (7) Bhuban Pal's Bazaar.

Seven bazaars named in the marginal List B remained unregistered on the expiry of the time allowed by the Act. The requisitions, however, which the Justices had issued for their improvement were complied with, and licenses were granted in 1873.

Act IV. of 1876 (sec. 340, cl. (f)) empowered the Commissioners for the first time to make bye-laws, subject to the confirmation of Government, for the inspection and management of markets and the conduct of business therein. The Act of 1888 contained more detailed provisions on the subject, while the Act now in force empowers the General Committee to frame bye-laws for the various purposes stated in its section 559, cl. 32, 33, 34, 35, 36, 38, and 39.

'Rules,' which were expected to prove less oppressive than bye-laws, and which at the same time could deal with details not specifically covered by the authority to frame bye-laws, were passed in 1880 for the regulation of municipal markets; bye-laws were made in 1903 for the control and regulation of the sanitary condition of *all* markets, and in 1904 to prevent persons attacked by loathsome diseases from keeping stalls or dealing with articles of food in any market.

Bye-laws passed in 1910 dealt with the management and control of municipal markets, and provided that private markets also should be open at all reasonable times to inspection by municipal officers. In 1906-7 the policy of securing the improvement of private markets was pushed on with vigour, and important results, such as the definition of boundaries, the paving and widening of approaches and passages, drainage and water supply, and the provision of conveniences, have been obtained.

SLAUGHTER-HOUSES

Construction of a Municipal Abattoir.—Sir Ranald Martin in 1834 recommended that ‘all butcher’s markets and slaughter-houses should be removed to the outskirts of the town, on the river bank, and be constructed on more approved principles than any now extant.’

In 1864 the Sanitary Commissioner for Bengal drew attention to the insanitary condition of the slaughter-houses in the neighbourhood of the town, and recorded the opinion that it was a scandal for a city like Calcutta to have no decent and properly supervised public abattoir. Government thereupon appointed a small Committee to inquire into the subject. The Committee reported in November of 1864, condemning the existing slaughter-houses in the strongest terms, and recommending that one large public abattoir should be established, under the strict control of the Municipality. In 1865 the Justices expressed their readiness to construct a slaughter-house, but pointed out that it was essential to frame bye-laws under Act VI. of 1863 enforcing the closure of all existing slaughter-houses, prohibiting the use of any place for this purpose unless duly licensed, and providing for the inspection of animals before slaughter, the management and control of the proposed abattoir, and the levy of fees from those using it.

Act VII. of 1865 was passed to bring all slaughter-houses within their jurisdiction under the control of the

Suburban Commissioners, who agreed to license no private slaughter-houses in the suburbs except in consultation with the Justices.

Steps were then taken by the Justices to construct a slaughter-house near the high-level sewer; good drainage arrangements were made and an abundant supply of water provided. The building was constructed by Messrs. Nelson and Co., the total cost of the scheme being $2\frac{1}{2}$ lakhs.

The work was not completed until July 1869, the buildings being formally opened in September of that year. The Suburban Commissioners then took measures to close the old private slaughter-houses. Convictions obtained against the owners under the Act of 1865 were however set aside on appeal, and the unlicensed premises remained open in defiance of the provisions of that Act. In 1871 the Magistrate of the Twenty-four Parganas took action, under the Criminal Procedure Code, against the owner of a slaughter-house at Narkeldanga, and later against the proprietors of the shambles at Karaya.

The order of the lower court directing that the slaughter-houses should be closed was upheld on appeal, and the opposition of the private slaughter-house owners collapsed. The butchers began to resort to the municipal abattoir, and the abominable institutions, which had so long menaced the health of the city, gradually disappeared.

The site on which the original municipal slaughter-house stood was intersected by the municipal railway and the high-level sewers. The 'open cut' for the storm-water drainage works subsequently encroached on the premises, and the building, which had been designed as a slaughter-range for pigs, was then dismantled, and about $2\frac{3}{4}$ bighas of land made available for this channel.

The present buildings consist of

- (1) Two double ranges for the slaughter of cattle, each 200 feet \times $56\frac{1}{2}$ feet in area.
- (2) A circular masonry tower, 62 feet high and 26 feet in diameter, carrying an iron reservoir, where

an adequate supply of water is maintained for 'washing down.'

- (3) Quarters for the Superintendent.
- (4) Butchers' and menials' quarters, with kitchens and necessities.
- (5) A roofed cattle-pen, 110 feet \times 20 feet in area, with stone floor and water-troughs, connected with a large enclosure or cattleyard.
- (6) An offal shed, 82 feet \times 22 feet.
- (7) An office room, 22 feet \times 10 feet.

Until 1875 the supply of water had been drawn from the Beliaghata Canal, but the canal being in that year temporarily closed for re-excavation, the opportunity was taken to connect the premises with the waterworks.

In 1880-81 the slaughter-house was greatly improved by the construction of a boundary wall, which enclosed an area of nearly 9 bighas. In 1903-4, 1906-7, and 1907-8 important improvements were carried out at the instance of the Markets Committee.

New Stockyard.—The Calcutta butchers usually purchase their cattle at *hâts* or fairs outside the town, and to save any intermediate cost of housing drive the animals direct to the slaughter-house. It was recognised that the practice of slaughtering hot and exhausted cattle prejudicially affected the quality of the meat, while on humanitarian grounds grave objection was taken to the conditions under which the cattle were packed for hours, often without food and beyond reach of the water-troughs in the limited space available at the slaughter-house. In 1909 the Health Officer proposed that a large stockyard should be provided, through which all the animals should pass; they were to be rested there for not less than twenty-four hours, and a small charge for housing, feeding, and watering them to be levied on their owners.

A plot of land 6 bighas 18 kothas and 9 chittaks in area has been acquired near the slaughter-house, at a cost of nearly Rs75,000, and buildings comprising two lodges for the *durwans* or gate-keepers, servants' quarters,

veterinary surgeon's quarters, isolation shed, sheds for sheep, goats, and cattle, are at the time of writing approaching completion.

Internal Working of the Slaughter-House.—A veterinary surgeon has been employed since 1907 to examine the animals before slaughter. The sound animals are then passed through a turnstile, after payment of the fees; a separate ticket or voucher is issued for each animal as it passes into the slaughter-ranges, and subsequently handed over to the *mullahs* (*i.e.* killers) before the animal is slaughtered. The vouchers thus collected are subsequently checked against the ticket-clerk's 'punch' number and the cash receipts, which are remitted next morning to the treasury. The premises are open for the slaughter of goats at 3.30 A.M. each day, the work being concluded by 7.30 A.M. The afternoon slaughter, at which goats, sheep, buffaloes, cows, bullocks, and calves are dealt with, commences at 4 P.M. The mutton and veal is first examined and classified, being marked according to its quality as 1st, 2nd, or 3rd class meat, and then despatched in special municipal meat-vans, securely locked, to the Sir Stuart Hogg Market, where the meat is unloaded and made over to its owners. The carts then return to Tangra for the conveyance of the beef, veal, and buffalo flesh to the market. The carcasses are stamped according to the class (1st, 2nd, or 3rd) in which each is placed by the Superintendent of the Slaughter-House. Buffalo flesh is distinguished from beef proper. No goat flesh is admitted to the Municipal Market, while all meat consigned to the market is distinguished by its stamp from meat intended for private markets or shops. The meat-vans leave for the Municipal Market at 3 A.M. Slaughter ceases by 9.30 P.M., while excess fees are charged after 8.30 P.M. Sheep, goats, and calves are herded in a separate yard and passed through to the slaughter-ranges after examination by the veterinary surgeon. The two slaughter sheds comprise four ranges, each with 24 stalls for hanging and cleaning the carcasses of 3 buffaloes or 5 cows (or bullocks). Each butcher is required to take out a slaughter-house license, costing

Rs5 a year, and the following scale of slaughtering fees is in force :—

Buffalo	.	.	.	.	8 annas
Bullock or cow	.	.	.	.	4 „
Calf	.	.	.	.	1 „
Goat	.	.	.	.	2 „
Kid	.	.	.	.	1 „
Sheep	.	.	.	.	2 „

Hide dealers frequenting the slaughter-house pay a fee of Rs15 per quarter, and dealers in horns, offal, etc., are also required to pay fees for carrying on their trades within its limits.

Pig Slaughter-House.—In 1902 it was pointed out that the illicit slaughter of pigs was common, and that a small abattoir for swine should be provided by the Municipality. It was decided to place the new institution at No. 30 Tangra Road, a site belonging to the Corporation, and the work was completed in 1903-4 at a cost of Rs13,141. In 1914-15 the number of pigs slaughtered was 15,109, while the fees amounted to Rs7055. The Superintendent destroyed 5702½ lbs. of diseased pork.

In 1913-14 the total number of animals slaughtered at the Tangra abattoir was 249,482, which included 110,147 oxen and buffaloes, 71,272 sheep, 56,340 goats, 10,201 calves, and 1522 kids.

• The total receipts, including slaughtering fees, permit license fees, fees from dealers in skins, offal, etc., amounted to Rs48,624.

During the year 1909 animals were rejected by the veterinary assistant at the preliminary examination.

Halliday Street Slaughter - House.—The principle of decentralisation adopted in 1901-02 had, as we have seen, important results ; the multiplication of municipal abattoirs was also due largely to its influence. In 1902 it was decided to convert the municipal model cattle-shed constructed in Halliday Street in 1884-85 into a slaughter-house for Muhammadans. The alterations were effected at a cost of Rs4457, and the building opened

in December 1903. Large additions were proposed in 1907-8, but the Marwaris residing in that locality petitioned for the removal of the institution, and offered to purchase the site and buildings if the slaughter-house were removed to a more suitable locality. It was subsequently decided to erect a new slaughter-house in Eden Hospital Road, and to close the institution in Halliday Street, but the new building when almost completed¹ had to be abandoned, as the site was found to fall within the alignment of the central avenue contemplated by the Improvement Trust. The question of concentrating all slaughtering at Tangra then arose, and in 1915 it was decided to transfer Muhammadan butchers from Halliday Street to Tangra, while they were allowed also to make use of the new slaughter-house at Halsibagan. The Halliday Street slaughter-house was closed on the 1st September 1915.

In 1913-14 no less than 108,372 goats, 4858 sheep, and 95 kids were slaughtered in Halliday Street; 343 animals were rejected after the veterinary examination. The fees increased from Rs1200 in 1903-4 to Rs14,160 in 1913-14. The figures for 1914-15 were almost identical with those of the previous year.

Other Slaughter-Houses.—In September 1909 a Hindu slaughter-house was opened at 119 Upper Chitpore Road, behind the Allen Market, and it has steadily prospered; the building cost Rs9520, while the site was valued at Rs8062.

In 1913-14, 32,742 goats, 311 sheep, and 151 kids were slaughtered on these premises; the fees amounted to Rs4154; 108 animals were rejected before slaughter. A similar slaughter-house was attached in 1912 to the Lansdowne Market. In 1913-14 the total number of goats slaughtered was 23,204, of which 700 were slaughtered by and for Hindus, while 22,504 were slaughtered in the Muhammadan section, which was opened in 1913; the fees amounted to Rs2175.

There are also three non-municipal slaughter-houses, at which the following slaughters occurred in 1913-14 :—

¹ The contractors were paid Rs16,410 for the work done.

- (1) Sonadanga Slaughter-House, outside municipal limits and under Government control; the Corporation lends the services of a veterinary assistant as supervisor . . . 46,381 animals.
- (2) Jewish slaughter-house . . . 676 „
- (3) Hindu slaughter-house at 52 College Street . . . 2558 „

The following figures indicate how the work at the municipal slaughter-houses has expanded :—

Year.	Cattle.	Calves.	Sheep, Kids, and Goats.	Swine.	Total.
1870	14,689	2,773	1,069	...	18,531
1871	43,066	7,651	63,264	...	113,981
1880	81,095	12,928	119,085	...	213,108
1890-91	82,972	14,114	124,869	...	211,955
1900-1	90,078	13,438	67,001 ¹	...	170,517
1910-11	90,047	11,579	279,715	12,680	394,021
1913-14	110,147	10,201	{ 76,441 sheep 1,768 kids 220,658 goats }	13,775	432,990
Private and Government Slaughter-houses 1913-14	15,128	1	{ 8,983 sheep 23,947 goats 1,556 kids }	...	49,615

The following Table shows the number of animals rejected at the slaughter-houses in 1913-14 after veterinary examination :—

Cattle.					Sheep, Goats, Kids.	Swine.
Buffaloes.	Bullocks.	Cows.	Calves.	Total.		
164	710	94	262	1230 ²	1122 ³	3950 lbs. pork (destroyed)

Kalishthâns.—Calcutta at one time abounded in *Kalishthâns*, i.e. places where goat's-meat was sold in the presence of an image of Kali, to show that the animal had been consecrated to the goddess before it was sacrificed.

In 1877-78 memorials were submitted to the autho-

¹ The extraordinary decrease in 1900-1 on the figures for 1890 indicate of course inefficient supervision of illicit private slaughtering.

² 7873 lbs. of diseased meat also destroyed.

³ 209 lbs. of diseased meat also destroyed.

rities, urging the suppression of these places, where slaughtering was carried on under insanitary conditions, and the flesh exposed in an unsightly manner. Some rules were framed by the Corporation to bring these places under supervision, but they proved ineffectual. In 1880 it was decided that *bonâ fide* Kalisthâns, at which worship was carried on, were protected from the operation of the Act, but in 1884 the Commissioners recognised that the inspection of all Kalisthâns was necessary to prevent the sale of unwholesome meat, and that it was essential to have all such places connected with the drainage system.

In November 1884 a bye-law was passed prohibiting slaughter at any place not approved for the purpose by the Commissioners, and the Health Officer declined to license the Kalisthâns, for the efficient inspection of which a large staff would have been required.

In 1885-86 it was decided to concentrate all the existing Kalisthâns in two places—one in the north and one in the east of the town—where goats might be slaughtered with the prescribed rites under conditions approved by the Municipality. It was proposed to erect two buildings for the purpose at a cost of Rs20,000, but a memorial against the scheme was at once drawn up by the people residing near one of the selected sites.

The project was abandoned, and it was decided to distinguish between the *bonâ fide* Kalisthâns, where worship was carried on and goats duly consecrated to the goddess, and the sham Kalisthâns, which were in fact mere slaughter-houses. It was however impossible for the inspecting staff in the majority of cases to establish the distinction, and the control of the Municipality proved quite illusory.

In 1892, nevertheless, the same principle was reaffirmed by the Commissioners. A new difficulty was raised by the Health Officer, who reported that many premises, licensed as meat-shops, were virtually slaughter-houses, conducted behind closed doors or clandestinely at night.

Illicit Slaughtering.—Vigorous measures to check the illicit slaughter of goats and kids were first taken in 1897-98. This work, which had at different times been

entrusted to the conservancy staff and to the slaughter-house superintendent, was made over to the medical inspectors under the supervision of the Health Officer. The control of meat-shops was in the hands of the sanitary inspectors. In 1899-1900 a special officer was temporarily appointed to prevent illicit slaughtering. In 1901 a permanent post of Slaughter-House Inspector was created, and a second inspector was sanctioned in 1902 ; they are required to prevent illicit slaughtering,¹ and thereby to compel butchers to resort to the municipal or other licensed slaughter-houses. An additional meat inspector has since been appointed, and attempts are being made to improve the insanitary and repulsive petty meat-shops which abound in Calcutta.

In 1913-14 there were 187 prosecutions for illicit slaughtering and sale of meat without license.

Bye-laws.—Bye-laws framed under section 559(34) of Act III. of 1899 were sanctioned under Government Notification of 23rd December 1903. They prescribe the terms and conditions on which licenses to use the municipal abattoirs are to be granted, hours and mode of slaughtering, and the examination of all animals before slaughter, the method of disposing of skins, offal, and other by-products of the carcasses, the conditions on which meat may be sold on the premises, and finally the measures to be taken for the cleanliness and general sanitation of the slaughter-houses.

Revenue.—Viewed as trading concerns, the municipal slaughter-houses are valuable assets.

In 1913-14 the total number of animals slaughtered was 432,990, and the total revenue amounted to Rs89,757, of which Rs71,714 was realised as slaughtering fees.

After allowing for cost of establishment, lighting and other miscellaneous charges, repairs and renewals, rates and interest and sinking fund, the net profit for 1913-14 amounted to Rs37,142.

The following Table shows the receipts and expenditure (revenue funds) on account of markets and slaughter-houses since their inception :—

¹ As there are now only two private slaughter-houses left, these inspectors are more properly termed Meat Inspectors.

SLAUGHTER-HOUSES

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Year.	MARKETS.		SLAUGHTER-HOUSES.	
	Receipts.	Expenditure.	Receipts.	Expenditure.
	Rs	Rs	Rs	Rs
1868	...	...	...	84,665
1869	...	...	1,213	30,109
1870	...	...	2,793	6,898
1871	...	...	14,287	10,880
1872	...	...	31,827	12,698
1873	...	...	31,297	11,239
1874	57,368	95,105	36,651	11,385
1875	1,01,554	41,674	37,124	19,845
1876	97,186	11,402	37,368	10,512
1877	98,734	11,204	39,930	13,811
1878	1,03,823	15,557	39,620	10,468
1879	1,00,199	13,807	36,666	11,618
1880	1,06,199	16,317	41,149	14,318
1881	1,05,497	17,708	38,916	12,888
1882-83	1,12,087	23,160	41,174	15,984
1883-84	1,22,368	19,631	42,389	16,932
1884-85	1,27,920	19,481	40,395	10,334
1885-86	1,40,841	18,287	39,835	10,449
1886-87	1,41,491	18,916	39,440	9,935
1887-88	1,32,128	17,689	35,996	11,147
1888-89	1,18,588	15,767	37,130	9,575
1889-90	1,20,477	17,028	42,164	8,167
1890-91	1,21,657	15,047	40,955	9,035
1891-92	1,22,478	18,758	44,787	8,161
1892-93	1,27,221	16,733	39,281	8,231
1893-94	1,32,310	14,702	37,939	8,087
1894-95	1,30,823	12,392	44,522	9,221
1895-96	1,36,996	15,687	45,062	7,668
1896-97	1,34,890	18,132	37,971	7,938
1897-98	1,33,556	47,621	41,149	8,633
1898-99	1,30,182	21,469	31,085	9,226
1899-1900	1,62,595	19,475	35,357	8,121
1900-1	1,71,911	22,287	35,310	7,933
1901-2	1,80,389	46,797	41,188	8,908
1902-3	1,79,312	64,275 ¹	46,006	64,275 ¹
1903-4	2,25,786	1,01,232 ¹	47,617	1,01,232 ¹
1904-5	2,33,035	39,168	58,070	21,265
1905-6	2,38,992	47,861	65,162	22,301
1906-7	2,56,299	34,642	67,192	22,115
1907-8	2,85,987	45,709	66,876	23,962
1908-9	2,62,455	41,638	66,721	24,084
1909-10	2,96,123	42,025	72,492	27,654
1910-11	3,62,019	61,419	83,572	30,610
1911-12	3,75,682	76,244	83,547	37,352
1912-13	3,93,604	...	...	...
1913-14	4,02,196	...	89,757	...

¹ The expenditure for 1902-3 and 1903-4 is shown jointly, and the figures also include expenditure on *dhobikhana*s.

DHOBIKHANAS (WASH-HOUSES)

In 1889 the Chairman's proposal to construct public *dhobikhana*s, similar to those already opened in Bombay, met with general support, and in January 1890 the Commissioners sanctioned the establishment of such an institution, the cost being charged to loan funds. Land was accordingly acquired at No. 3 Ulfatbagan Road, Kasiabagan, at a cost of Rs32,000, but no further steps were taken until 1895, when an estimate of about Rs37,000 for building and equipment was sanctioned. It was however decided to provide in the first instance only half the accommodation required, until the popularity of the institution could be judged. In 1896-97 a building equipped with 100 wash-stones and an ample supply of filtered water was constructed at a cost of Rs23,400. The institution achieved immediate popularity, and all the stones were occupied.

In 1903-4 another dhobikhana with 20 wash-stones was constructed in the northern division (Kumar Dinendra Narayan Roy Street), at a cost of Rs10,500; the number of stones is now 30.

In 1906-7 the Corporation accepted Mr. J. C. Galstaun's offer to purchase the site of the Ulfatbagan dhobikhana, which was no ornament in a rapidly improving neighbourhood; Mr. Galstaun agreed to rebuild the dhobikhana and set up its 100 wash-stones on any site the Commissioners might select. This agreement became a part of the elaborate settlement, dealing with the old Kasiabagan burial-ground, and there were many vexatious delays before the new dhobikhana was constructed, on the site acquired by the Corporation near the junction of Hazra and Lansdowne Roads.

An indirect, yet most important result of removing the dhobikhana from Kasiabagan, was the small but successful experiment in town-planning to which the original project led. This scheme however will be more properly dealt with in the account of Maddox Square. The dhobikhana has now 180 stones, of which on an average 167 were occupied throughout 1913-14.

Administration of Dhobikhana.—The *dhobis* pay a monthly rent of Rs2 for each stone that they use, and an additional R1 a month for each assistant.

On payment of these charges a monthly ticket is issued to the dhobi, whose name as well as that of his servant, if any, is registered by the dhobikhana supervisor. He is not allowed to use any chemicals except those authorised by the Health Officer, and no animals or persons suffering from any infectious or contagious disease are admitted into the dhobikhana. The receipts from the North Dhobikhana amounted to Rs1069 in 1913-14, while those of the South Dhobikhana were Rs6068. The charges levied from the dhobis are more than moderate, and after paying for establishment, interest, and sinking fund charges, etc., the Corporation incurs an annual loss of about Rs16,000 on these institutions.

On the other hand, the advantage enjoyed by the public of Calcutta in having its washing done cheaply under sanitary conditions, is important from the standpoint of public health, and the wisdom of this expenditure has never been questioned.

It was decided in 1910 to install a municipal steam washing plant, in view of the damage done to clothes by the crude system which the *dhobis* employ, of beating them on stones. Machinery was obtained from England in 1914-15, and set up at a cost of Rs6925; a building was constructed at the Lansdowne dhobikhana at a cost of Rs4283. It was then however found that in order to maintain an even pressure of filtered water for the plant, it was necessary to provide an overhead tank with force-pump, etc.; the necessary arrangements are being made at the time of writing.

CHAPTER X

LIGHTING AND TELEPHONE

Early Arrangements.—Until July 1857 Calcutta was lighted exclusively with oil lamps. In 1836 we find that the lamps and lamp-posts were furnished at a fixed rate by a Corporation employé, designated the Executive Officer, who was a kind of foreman for engineering work, under Lieutenant Abercrombie, and was paid Sicca Rs300 per mensem.

There were only 313 lamps for the whole of Calcutta, and no attempt was made to light the poorer parts of the city. A contractor supplied oil, wicks, etc., and attended to the lighting and cleaning of the lamps, at a monthly cost of Rs1.2.6. per lamp. The total cost of the lighting amounted to less than Rs7000 per annum. The contractor's work was supervised by an overseer, who was paid Sicca Rs60 a month, and was also expected to superintend the watering of half the town.

On the 1st January 1855 a new lighting contract for five years was concluded with the former contractor, Mr. Statham, the rate being fixed at Rs3.8 per lamp per month; a proviso was added enabling the Commissioners to end the contract on six months' notice if they should wish to introduce gas lighting.

Under section 50 of Act XII. of 1852, the occupiers of premises valued at or above Rs70 a month were bound to provide gate lamps at their own cost. This obligation was however removed by Act XXVIII. of 1856, which authorised the levy of a 2 per cent. lighting-rate on the occupiers of premises valued at Rs120 or more per annum.

In 1854-55 there were 417 public lamps, which cost the town Rs16,487 in that year.

Introduction of Gas.—The arrangements made with the Oriental Gas Company were sanctioned by Government in June 1857. Under the contract, dated the 14th May 1857, the Company was to supply gas with an illuminating power of 12 c.p. for 600 public lamps, which were to be cleaned and lighted by the Company's staff. They were to burn on an average for ten hours a night, and the annual cost was Rs90 for each lamp. A rebate of 8 annas was to be allowed for every 1000 feet of gas consumed a month in excess of 2 million cubic feet, with a further rebate of 8 annas if the quantity consumed was in excess of $2\frac{1}{2}$ million cubic feet. The posts and brackets were ordered direct from the United Kingdom, and the Gas Company reported the completion of their work on the 6th July 1857; Chowringhee was that evening lighted with gas.

In 1857 the lighting rate demand amounted to Rs1,19,117. The collections were by no means good,¹ and at the end of the year there were outstanding bills valued at Rs54,293; at the end of 1858, however, the Commissioners, after providing for the sanctioned lighting of the town, viz. :

600 gas lights at Rs90 per annum	.	.	Rs54,000
1000 oil lights at Rs42 per annum	.	.	42,000
Total	.	.	<u>Rs96,000</u>

anticipated a surplus of Rs75,000, and therefore prepared to extend the lighting of Calcutta. It is interesting to find that the Commissioners contemplated fixing gas posts along the centre of the widest streets, but the innovation did not commend itself to the public. In 1860 the net revenue available for lighting, after deducting cost of collection and expenditure for new posts and allowing for depreciation of stock, amounted to Rs1,15,305; 1000 gas lights and 800 oil lights were at this time sanctioned, which would have cost Rs1,23,600 per annum, but there was in fact no deficit, as much time was required

¹ *Occupiers* and not *owners* of premises were liable for the lighting rate, and where the occupancy changes frequently, the difficulty of realisation from the occupier is obvious.

for procuring lamp-posts from England, for laying new mains, and for the fixture of lamps.¹

The gas-posts ordered from England, with lamps and fittings complete, cost Rs35 each, while the cost of fixing, which was carried out by the Company, was Rs8.4 per lamp. In 1860 the Gas Company preferred a claim of Rs7733 for gas consumed in excess of the stipulated quantity of 5 cubic feet; the Commissioners repudiated the claim, on the grounds that

- (1) The lamps were in certain localities lighted earlier than was necessary, in order to suit the convenience of the Company's lighting staff;
- (2) In the absence of proper meters, and having regard to the illumination given, there was no positive proof of the lamps actually consuming 5 cubic feet per hour as contracted.

There were 805 oil lamps at the end of 1860, a new contract for four years having been concluded, by which the rate per lamp was reduced to Rs39 per annum. In 1864 a great deal of damage was caused to the public gas-posts by the great cyclone of that year.

Illuminating Power of Gas.—No photometric tests were made by the Corporation until 1869.

Continual complaints from the public on the quality and quantity of gas supplied by the Company, led in 1871 to the appointment of a special committee to report on the subject. On their recommendation improved photometric apparatus was obtained from England, and systematic tests commenced from the 1st April 1871. The chemical analyst reported that the burners were defective, and that the stipulated quantity of gas was not being supplied, while he subsequently² reported that 'the Calcutta gas is certainly equal, if not superior, to the London gas as regards the amount of impurities, but that in the matter of illuminating power it is sadly deficient.' During the next twenty-five years little

¹ Actually only 766 gas lights, exclusive of 60 paid for by the Commissioner of Police in the Maidan, Strand Road, and Eden Gardens, had been fixed at the end of 1860.

² In 1876.

improvement was effected, though such measures as the placing of lamps alternately on both sides of the road, the close scrutiny of lighting bills submitted for quarters where the lighting was most defective, and lastly the erection of powerful lamps at street corners, had beneficial results. In 1901 began the substitution of incandescent burners for the old lamps—an innovation which enormously increased the efficiency of the lighting.

Contracts with the Gas Company.—The contract of 1857 expired in 1878, and a new contract was executed, of which the most important provisions were the following :—

- (1) The rate per lamp was fixed at Rs4.13.4 per mensem, every lamp in excess of the initial number (3791) being lighted at the rate of Rs4 a month.
- (2) The illuminating power was to be 14 c.p. and to be increased to 15 c.p. on payment of 4 annas per lamp per annum.
- (3) A deduction for short supply was to be made from the Company's bills at the rate of Rs3 for every 1000 cub. feet.
- (4) The Corporation was bound to maintain not less than 3791 gas lamps in the town proper.

The suburbs had a separate arrangement with the Company, and in 1893-94 the manager offered to have the two agreements, which were both to expire in 1901, modified so as to provide, with immediate effect, for an all-round annual rate of Rs48 per lamp, and to make other financial concessions, on condition that the Corporation renewed both contracts up to 1912.

The proposal was however rejected by the Commissioners, and some years later a new agreement for ten years, with effect from the 1st May 1901, was concluded on somewhat more favourable terms than before, one of its provisions securing the use throughout the city of incandescent burners.

Contract of 1911.—The preliminaries to the next agreement had some interesting developments. In 1907 tenders were invited for lighting the city by gas, electricity, or other illuminant.

Two tenders for electric lighting were received, but it was finally decided to accept the tender of the Oriental Gas Co., which offered to improve the city lighting at once, without waiting for the last three years of the old contract to expire. At this stage the legality of the proceedings was questioned, on the ground that both the advertisement and tenders should have been submitted to the General Committee, before being considered by the Corporation.

The defect was material, and the General Committee issued a formal advertisement, inviting tenders for lighting the streets with *gas*.

The Gas Company's tender was accepted, and Mr. Mansfield, who was appointed expert adviser to the Corporation, was authorised to negotiate with the Directors of the Company in London, with the object of securing a higher pressure, and lamps and burners of the most modern type.

The contract was executed on the 4th December 1909 after prolonged discussion. It provided for *the supply of gas only* by the Company, the actual lighting to be done by the Corporation, through the agency of a special department. The minimum gas pressure during the first five years of the contract was fixed at 2 inches, to be gradually increased to a pressure of 4 inches.

It was calculated that with the same consumption of gas, a 2-inch pressure would increase the luminosity from 24 to 60 c.p., which was adopted as the average requisite luminosity for street lamps, although the candle power would actually vary from 40 to 80, according to the width and importance of streets. Payment for the gas was to be determined not by meter, but by the size of the nipple used

Orders for burners, mantles, and mantle protectors were placed in January 1911, but it was found that they could not be supplied by the 1st May 1911, on which date the Corporation was to take over the lighting of the city. A draft agreement for an *ad interim* period of twenty-one months, commencing from the 1st May 1911, was accordingly prepared in Calcutta, in consultation

with Mr. Abady, the representative of the Directors, who happened to be in India at the time. On the 24th April the Corporation was astounded at receiving a cable from the Directors, refusing to confirm this arrangement.

The position was serious, as the existing contract was to expire within a week; the situation was however firmly handled by the Chairman, and the Gas Company, on the authority of the Directors, agreed to an extension of the existing arrangements for nine months, on the expiry of which the municipal Lighting Department¹ was in a position to take over its new duties.

Lighting of Special Areas.—The history of the lighting of certain special areas requires separate mention. Thus the Commissioners did not become responsible for the lighting of Hastings until 1867, just before that district was included within the municipal jurisdiction by Act V. of 1868. The introduction of gas lighting into the suburbs dates only from 1878, while the quasi-public roads on the property of the Port Commissioners were not lighted by gas until 1894-95.

The Corporation continued to bear the cost of lighting these roads until 1908-9, when the obligation was questioned, and held to have no legal force; the charge on that account therefore ceased.

In 1902-3 the Government of Bengal requested the Corporation to improve the lighting and paving of the 'commercial area'; their proposals were carried out at a cost of Rs1,13,000, which was reimbursed to the Corporation by Government. An annual grant of Rs5000 is also made by Government for the additions to the permanent staff required by these improvements, by which 440 additional burners were set up in the principal streets of this area.

Lighting of Harrison Road.—After the completion of Harrison Road in 1891, the Commissioners arranged with contractors for its lighting by electricity.

The lamps were to be of 1200 c.p., and the contractors were to superintend the lighting for three months.

¹ Described in pp. 76-78.

The dynamos were set up at the Halliday Street Pumping Station, the cost of the installation amounting to Rs92,000.

In 1895-96 the substitution of overhead for underground cables caused a temporary suspension in the electric lighting of this road, and an expenditure of Rs10,600 was subsequently necessary to bring the wiring into conformity with the Board of Trade regulations.

Arrangements were made with Messrs. Kilburn and Co. to work the plant for an annual payment of Rs9750.

In 1898-99 it was thought that the installation might be supplied more economically by the new Calcutta Electric Supply Corporation, but it was proved that the separate plant system was in all the circumstances the cheapest, and the agreement with Messrs. Kilburn and Co. was renewed. In 1904-5 tenders for lighting Harrison Road were received from the Oriental Gas Co. and the Electric Supply Association. The offer of the former to light the street with seventy Lucas lights, at an annual charge of Rs8220, was accepted, and the plant at Halliday Street was sold in 1905-6.

High-Pressure Gas Lighting and Electric Lighting.—

In 1909-11 the advisability of improving the lighting of the more important thoroughfares was considered by the Corporation, and recently (1914-15) comparative experiments have been made between an installation of high-pressure gas lighting with Keith lamps of 500 and 1000 candle power in Corporation Street and Chowringhee, and the latest type of high-power electric lamps, fixed in Corporation Street by the Electric Supply Corporation at their own cost. Electric lights of 34-100 candle power have also been installed in the new Fringe Area main road, connecting Manicktollah and Ultadinghi Roads.

Lighting of City.—The following figures show the improvements effected in lighting since 1863 :—

LIGHTING

Year.	Oil Lamps.	Gas Lamps.	Cost (establishment, illuminant, stores, etc.).
1864	677	1,084	Rs1,15,066
1870	621	2,711	2,12,202
1880	151	3,859	2,44,760
1889-90	{ Town, . . . 368 Added area, . 687	{ Town, . . . 4,524 Added area, . 494	{ 3,00,747
1890-91	1,158	5,397	3,23,015
1900-1	2,295	6,811	4,61,804
1905-6	2,379	8,997	5,83,246
1910-11	2,192	10,185	6,65,829
1914-15 ¹	1,759	11,900	7,97,039

The income from the lighting-rate amounted in 1914-15 to Rs7,84,145.

Electricity Supply.—The supply of electricity to the town of Calcutta is governed by Act IX. (B.C.) of 1895, which authorises the Local Government, with the consent of the Corporation, to grant licenses to companies formed to supply this commodity, and to frame rules and conditions regulating the operations of such companies. The main principles which the rules were framed to secure are—(1) the safety of the public, (2) the limitation of prices, and (3) a regular and adequate supply.

The first company licensed under the Act of 1895 was the Calcutta Electric Lighting Corporation Ltd., which subsequently obtained a license to work electric tramways.²

The license was renewed in 1906, and in giving their consent the Corporation took strong exception to the excessive rates charged by the Company, citing the much more favourable terms on which the public of Bombay obtained their supply. The representations of the Commissioners appeared to receive scant consideration from

¹ In Chowringhee Road seventy-three 900 c.p. electric lights have been erected, and experiments are being made elsewhere to compare electric and high-pressure gas lighting.

² Vide pp. 322-331.

Government, but a slight advantage was gained by the grant of a rebate for prompt payment, equivalent to a reduction of 25 per cent. on the existing rates.

The Company receive exceptionally favourable treatment from the Corporation, inasmuch as they pay merely a nominal rent of R1¹ per annum for each pole fixed in the public streets.

Telephone.—In 1881 the Government of India gave their consent to the Oriental Telephone Co. for the erection and working of telephone exchanges in Calcutta, and in the same year the Corporation gave their provisional sanction to the scheme, which was then carried through.

A formal contract was executed in 1883-84 ; a nominal rent of R1 per annum was charged by the Corporation for each post erected in the public streets and Rs2 for each tripost. On the application of the Oriental Telephone Co., the concession was transferred to the Bengal Telephone Co., and in 1884-85 similar privileges were granted to the Crossley Telephone Co., which however was subsequently merged in the former Company.

In 1905 the agreement with the Bengal Telephone Co. was revised,² and renewed for a period of twenty years.

The Corporation charges a rent of R1 and Rs2 per annum for each single and double pole, and Rs50 per annum for each mile of duct, including manholes, subject to a minimum of Rs1000 a year.

TRAMWAYS

First Calcutta Tramway.—Power to construct railways in the town, and to lease or demise them to a company, was first conferred on the Justices by Act IX. of 1867.

Three years later the Government of India³ pressed upon the Government of Bengal the expediency of pro-

¹ Rs2 per annum for double poles.

² It was formally executed on the 18th June 1907.

³ Government of India, No. 531 R, dated 29th March 1870.

viding facilities for the transport of goods within the town to and from Sealdah Station. The Local Government, after consulting the E.B. Railway officials, asked the Justices for an expression of their views.

The Justices were willing to allow tramways to be laid in certain streets,¹ provided that Government bore all construction expenses, and made itself liable for any damage caused to sewers, water-pipes, drains, and private houses. The Local Government thereupon appointed a committee to report on the detailed plans and estimates, prior to their submission to the Government of India. The Committee reported on the 24th August 1870, and the Government of India passed its final orders in March 1871.²

‘It may be considered as decided,’ they wrote, ‘that street tramways shall, if possible, be introduced. The advantages to all interested in the trade and commerce of Calcutta, to the state, the city, and the railways terminating in it, are too obvious to require demonstration, and are, in fact, universally admitted.’

As for ways and means, the Government of India offered to lend money on the security of the general rates, the lines to belong to the Justices, and the Government to exercise only ‘a moderate degree of supervision over the undertaking.’

In the event of the Justices not accepting this proposal, the Government of India suggested that they should be asked to ‘act as the agents of the Government in respect of the construction, management, and working of the lines, which would then be the exclusive property of the State.’

It was considered that a commencement might be made with a line connecting the Sealdah terminus of the E.B. Railway and the river bank, the sole object to be kept in view being ‘to provide a convenience to the commerce of the city of Calcutta at the smallest possible cost.’

The Government of Bengal, in communicating these

¹ *I.e.* in three of those suggested by the E.B. Railway officials, viz., Bowbazaar, Strand Bank, and Bhowanipore Road, but not through Nimtola, which they considered too narrow.

² Government of India letter, No. 504, dated 21st March 1871; Government of Bengal letter, No. 644 G, dated 30th March 1871.

views to the Justices, recommended that a committee representing the Corporation, the Port Commissioners, and the Railway Department of Government, should be appointed to advise in the matter. The Justices, after considering the alternative proposals of the Government of India, preferred to have the tramways under their own direct control and management, and agreed to construct them with capital advanced by the State.

They appointed a committee, as suggested by Government, to prepare a scheme. The Committee considered that, so far as goods traffic was concerned, the tramways would probably be chiefly used for the removal of country produce from Sealdah Station to the godowns situated in the vicinity of Strand Road and Sobha Bazaar, where they would be stored by the wholesale merchants, and they recommended that the first experiment should be made by laying a line from Sealdah via Bowbazaar to the river and then northward to Armenian Ghât and Aheeritollah Ghât, thence through Sobha Bazaar to Chitpore Bridge, crossing the Municipal Railway at Baghbazaar.

After some correspondence the Government of Bengal sanctioned the construction of a tramway from Sealdah to Armenian Ghât, at a cost not exceeding a lakh. The tramcars were to be drawn by horses. The line was completed in February 1873, at a cost of about $1\frac{1}{2}$ lakhs. Commencing at Sealdah, it ran along Baitakhana, Bowbazaar, and Dalhousie Square, through the Customs House premises into and along Strand Road to the terminus at Armenian Ghât. The line was opened to traffic on the 24th February 1873, and was worked for the conveyance of passengers only, up to the 20th November, at a loss of Rs500 a month. It was then decided to close the line. The inner history of this unhappy venture deserves elucidation.

Causes of Failure of the Scheme.—The scheme as originally sketched by the Government of India was not designed for the conveyance of passengers, but in the words of the despatch of March 1870, 'for providing such further facilities as may be possible for the transport of

merchandise from various parts of the river frontage, within the port limits, to the custom-house, private warehouses, the canal banks, and to the railway stations.'

With this view the Justices designed the scheme, and it was their intention, as stated to Government, that the working of the line should, if practicable, be left to private enterprise, the Justices permitting trucks to be run over the line on a mileage rate.

It should be noted that the Government of India in their despatch of 1871 had declared themselves 'decidedly of opinion that the E.B. Railway Co. should have no direct concern in any street railways in Calcutta,' and 'altogether averse to giving them a station on the river bank, either at Chitpore or elsewhere.'

The Committee, on which Colonel Taylor, consulting engineer to the E.B. Railway, had served, had borne this emphatic declaration in mind in selecting the route for the first experiment in city tramways, but the policy of the Government of India appears to have changed shortly after the tramway had been opened. It authorised the E.B. Railway Co. to extend its line to the river and to establish a terminal station at Chitpore—a concession which profoundly influenced the prospects of the municipal scheme. All goods traffic was at once diverted to the more powerful line, and an isolated tramway, barely two miles in length, could obviously not be expected to pay with passenger traffic alone, especially as its alignment from this point of view was by no means well chosen.

The Justices appointed a committee in 1873, with power to dispose of the line, with its plant and rolling stock, and also to grant, subject to the approval of Government, liberal terms to any responsible speculator who might be bold enough to initiate a more comprehensive tramway scheme.

In December 1873 it was decided to sell the tramway with its rolling stock to a Mr. Macallister at cost price, with permission to extend the line. The Local Government did not however favour¹ this method of cutting

¹ Bengal Government letter, No. 780, dated 7th February 1874.

losses unless the concessionaire was prepared to carry through a general tramway system in Calcutta.

At their suggestion the correspondence on the subject was published, and other projectors invited to submit offers.

One other offer was received, less advantageous to the Justices than that of Mr. Macallister. Government then consulted various public bodies, and decided that it was advisable to leave the construction of tramways to private enterprise, subject to some control by Government and the Municipality; and at the same time informed the Justices that the Port Commissioners would be permitted to lay an independent line along the river bank.

The Corporation were of opinion that they had not been very fairly dealt with, and in 1876 submitted a memorial to the Governor-General, urging their claim for compensation on the ground that the financial failure of their enterprise was largely due to circumstances arising from the action of Government. They admittedly had no legal claim to be indemnified against their losses, and their petition was unsuccessful; the rails and rolling stock were finally sold to the best advantage, and an ending thus made of the first attempt of the Corporation to provide the city with a tramway system.

Origin and Development of Existing System.—The next attempt was more successful. In 1878 schemes for a complete system of tramways were submitted by independent promoters, and on the 2nd October 1879 an agreement, which received the sanction of the Local Government, was executed between the Corporation and the Calcutta Tramways Co. Ltd.¹

The Company were granted the right to construct and maintain tramways, with single and (except in certain streets) double lines, and with all necessary sidings and connections, on eight routes, and between such other places as might subsequently be approved by the Corporation and Government. The scale of fares was to be fixed by the Company from time to time; an annual

¹ The original offer accepted by the Corporation was submitted by Messrs. Parish and Souttar, whose rights were acquired by the Company.

track-rent, at the rate of Rs2000 per mile of single line and Rs3000 per mile of double line, was to be paid to the Corporation, the rates to be subject to periodical increments, which would bring them at the end of the twenty-second year of the agreement up to Rs3000 and Rs4000 per mile respectively. The Corporation reserved the right of purchase at the end of twenty-one years, and (if its option should not then be exercised) at the end of every subsequent seven years. Act I. (B.C.) of 1880 embodied these terms, and conferred on the Corporation and the Company certain necessary powers for the working of the tramways.

Construction.—The construction of the lines was pressed on, and the Engineer to the Corporation granted a certificate authorising trams to be run along the Bowbazaar line on the 27th October 1880, and along the Hare Street line on the 19th November.

Difficulties were raised in connection with the proposed Chitpore line, and the Company was required to make some slight improvements in the street alignment before this project was sanctioned.

Maintenance of the Lines.—The lines were not well and solidly laid, and during the next fifteen years or more we find the Commissioners constantly striving—for the most part with very little success—to make the Company put its tracks into proper order. Shortly after the completion of the main system, the rails in many places stood up 2 inches above the roadway.

At length a thorough survey of the defective lines was carried out, and the Tramways Committee, which had acquired the status of a standing Committee, was finally driven, much against its will, to institute legal proceedings against the Company in September 1885. The Company was fined Rs50 on each count, but no improvement followed. In 1889 the Company was served with a formal notice to place its lines in order, and in 1890 was called upon to submit a report of the improvements made. The Corporation made certain suggestions to the Company after studying the report which the latter had submitted, and their action at last led to some definite

results. The defective lines were relaid with steel rails, on tracks prepared with stone setts and concrete floor. Defects are still frequently found on all the lines, but such an appalling danger as rails projecting 2 inches above the roadway is a thing of the past.

Motive Power.—(1) *Horse Traction.* The tramcars were at first drawn by horses ; owing to the severe strain to which the horses were subjected in the Indian hot weather, casualties were heavy, and the substitution of mechanical traction was desirable, both from economic and humane considerations.

(2) *Steam Traction.* In May 1882 the Company was allowed, as an experimental measure, to run steam-engines on the Chowringhee line for the period of one month. During this time six accidents occurred, in which however no persons were injured.

On the expiry of the month, the residents of Chowringhee were consulted, and were on the whole in favour of steam haulage being permanently adopted.

Locomotive engines were run in Chowringhee for a year, stringent rules regulating their speed, noise, hours of running, length of trains, and the conduct of drivers being framed with the sanction of Government. The system was however discontinued, as the lines did not at that time fall within the jurisdiction of the Municipality, which therefore found itself unable to exercise any real and effective control. During the Durga Puja, the Company continued to obtain special permission each year to run locomotives down Chowringhee, to provide transport for the pilgrims to and from Kalighat.

(3) *Electric System.* In 1896 Messrs Kilburn and Co. applied for a concession to introduce electric propulsion for the tramcars. They came to terms with the Tramways Company, whose financial position was at this time gloomy, but asked the Corporation to waive certain of the privileges—in particular the right of purchase—which they enjoyed under the Tramways Act. A reduction of the track-rent was also asked for.

The Corporation examined the matter with great care, and on the 28th January 1897 a special committee

was appointed to consider the terms on which electric traction could be introduced. The draft agreement prepared by this Committee¹ was approved by the Corporation, but its terms were not accepted by the Company.

In the meantime, the tram tracks had again fallen into disrepair, and the Corporation appointed an Inspector to examine the lines and report daily on the progress effected in repairing them, and at the same time suspended all negotiations on the question of introducing electric traction until the tracks should be placed in proper order. Prosecutions were also instituted. In 1899 the Company accepted the draft agreement with certain modifications, which bound them to complete the alteration and reconstruction of the lines by the end of 1899, and to substitute electric for horse traction by the 9th December 1902. The agreement, which was executed on the 9th December 1902, gave the Corporation the right of purchasing the tramway system, with all appurtenances, on the 1st January 1931, and thereafter at the end of every seven years, the purchase value to be calculated at twenty-five times the difference between the average gross annual receipts and the working expenses of the Company. The conversion to electric traction, with overhead or aerial wires, was completed on the 19th November 1902.

Track-Rent.—The scale of increments to which the annual track-rent was subject, under the original agreement with the Calcutta Tramways Co., is shown below.*

The yearly rent for the suburban line, *i.e.* from Circular Road along Russa Road, was fixed at Rs1000 per mile. In 1893-94 the Company, which was involved in financial difficulties, applied for a reduction of the track-rent, but the Corporation declined to consider this request, whereupon the London Directors cabled to their local

¹ Their final report was submitted on the 19th July 1898.

	Double Line.	Single Line.
* First 9 years	Rs3000	Rs2000
10th to 13th year	2250	2250
14th to 17th year	3500	2500
18th to 21st year	3750	2750
From beginning of 22nd year . .	4000	3000

manager to stop the cars. This threat achieved its object, and the Corporation agreed to abate Rs15,000 a year from their rent for the quinquennium commencing in 1894, subject to the condition that the abatement should cease if the dividends declared by the Tramways Company should exceed $3\frac{1}{2}$ per cent. per annum during that period.

The Company for their part agreed not to stop the running of the cars without the previous consent of the Commissioners. These terms were embodied in Act III. (B.C.) of 1894. Under the agreement of 1899 it was provided that track-rent should be paid up to 31st December 1900, at the yearly rates of Rs3250 and Rs2250 for double and single lines respectively in the town and Rs1000 per mile in the suburbs, and from the 1st January 1901 up to the date of completion of the electric system at the rates of Rs4000, Rs3000, and Rs1000 respectively. After the introduction of electric traction, a fixed track-rent of Rs35,000 per annum was to be paid.

Some years later it was discovered that no increase in the track-rent had been made on account of the extensions made by the Company since November 1902, but after a protracted correspondence the Corporation's claim, supported as it was by the opinion of the Advocate-General, was allowed, and the Company agreed to a proportionate increase in rent, with the payment of arrears due from 1902.

• *Regulations, etc.*—The power of the Corporation to regulate the working of the tramways, and of the Company to exercise some control over the conduct of its passengers, is defined in Act I. of 1880. The most important provisions of the bye-laws passed by the Corporation deal with the following points :—

- (1) The placing of stopping stations at street junctions.
- (2) The stopping of cars, when a line is obstructed, as during the passage of a procession or at certain fixed stations.
- (3) The provision of lights after sunset.
- (4) The proficiency of drivers.

The Corporation has other statutory powers over the Company, regarding the opening up of roads for repairing the lines, the proper maintenance of the rails and a strip of the roadway ; the licensing of drivers and conductors, and the regulation in certain circumstances of tramway traffic.

The system of fixed stopping stations—at some of which all trams must stop, while at others cars stop only when required—was not introduced until 1908-9 ; the Company was recently requested to illuminate such stations at night, but declined to do so on the score of expense.

The Corporation is now experimenting to remove the inconvenience caused at night by inserting panes of glass with the word ‘ tram stop ’ on the gas lamps nearest to stopping stations.

Inspection of Tracks.—The District Engineering Staff reports regularly on the condition of the tramway track, and defects are brought to the notice of the Company and remedied. The inspection is however necessarily of a somewhat perfunctory character, and in view of the fact that there were in 1914 over thirty miles of tramway, with rolling stock consisting of 245 motors and 245 trailers, the need of providing a special inspecting agency has been recognised. In 1913-14 the Police instituted eighty-four prosecutions for breaches of the tramway rules.

Mileage.—When the tramway system was electrified, in 1902 there were 85,188 feet of lines, of which about 1920 feet have been discontinued. As stated above, there are now thirty miles of line, and the Company have expressed their willingness to co-operate in providing additional facilities for easy and quick transit, provided there is a prospect of a reasonable return on the capital outlay.

In view however of the operations of the Improvement Trust, it is considered advisable to hold suburban schemes of extension for the present in abeyance.

WORKSHOPS AND MANUFACTORY

Origin of Workshops.—In 1855, when the first drainage scheme was designed, the Justices decided that it would be economical and prudent to erect their own workshops, mortar-mill, and sawing-machines, to ensure the prompt execution of the scheme.

A site nearly 3 bighas in area was purchased on the north side of the Beliaghata Canal for Rs4551,¹ and a workshop constructed and equipped with machinery, at a cost of about Rs30,000.

It served the needs of the Drainage Department until 1864, when the land and structure were sold to the E.B.S. Railway Co. for Rs28,000. Another site was then purchased at Entally for Rs9286, and new workshops built, which continued to do original and repair work for the different municipal departments, after the completion of the drainage works. The expansion of the waterworks in 1877, and the division of the town in 1901-2 into four fully equipped districts, afforded ample proofs of the usefulness of the workshops, which were accordingly enlarged. Their value was however frequently assailed on the ground of economy, but in 1896-97, and again in 1904-5, the Commissioners, after careful inquiry, were convinced of the utility of the institution.

System of Work.—The vexed question of municipal trading does not arise in connection with the Entally workshops, since no work, except in certain rare cases, and with the express orders of the Chief Engineer, is undertaken for other than municipal purposes.

Requisitions from municipal departments for the manufacture or repair of articles required for their work are admitted by the manager of the workshops if the

¹ In the Commissioners' First Drainage Report of 1858 the cost of the *ground* is stated to have been Rs3400. Mr. Clark, in his Second Drainage Report of 1861, states that the cost was Rs4551. The former statement refers to the site being cleared, and the figure given perhaps does not include the compensation paid for the existing buildings.

cost is covered by the budget grant ; articles which it is necessary to stock are manufactured on the sanction of the Chairman. Articles of standard size and measurement, which are largely used, are priced on the combined cost of materials and labour, plus 25 per cent. on such cost as a contribution towards establishment, contingent expenses, and depreciation of plant. Where work is done by contract labour, a special account is kept. No wastage of metal in foundry work is allowed in excess of a fixed percentage, and the turnings are regularly accounted for. Articles newly manufactured are made over to the storekeeper, who is responsible for seeing that an adequate supply is always in stock. The introduction of a continuous water supply has involved a great increase in manufacture, as every variety of water fitting has to be made and stocked. Engines, boilers, and other machinery, including steam road rollers, are kept in repair by the manager.

Organisation and Management.—The Engineer, Mr. Clark, originally supervised the workshops, but when he resigned his post, the Assistant Engineer of Waterworks assumed charge, the actual work being managed by a superintendent, who was also responsible for keeping in order and repair the locomotives and rolling stock of the municipal railway.

In 1901 Mr. Leslie of the B.I.S.N. Co. inspected the workshops, and in agreement with his report, a mechanical engineer on a salary of Rs600-800 was appointed to manage the workshops, and to look after the valuable machinery and plant belonging to the Corporation.

In 1905 a reversion was made to the former system of placing the workshops under the direct management of a less highly paid officer,¹ and of holding a more important officer—the Chief Engineer—responsible for the efficiency of the workshops and valuable municipal plant. The manager, who is assisted by a foreman in direct control of the labour, is responsible for the condition of the machinery and for the efficient and economical administration of the workshops.

¹ On a salary of Rs300-400.

Workshop Sections.—The workshops are divided into the following sections :

- (1) Machine and fitting shop.
- (2) Carpenters' shop.
- (3) Blacksmiths' shop.
- (4) Brass foundry.
- (5) Iron foundry.
- (6) Locomotive and wagon shed.
- (7) Boiler shed.
- (8) Engine and boiler house.
- (9) Stores.

In distinction from the permanent labour staff of the workshops, the blacksmiths, boilermaker and founders, are given work on contract, and employ extra hands at their own cost. They are under agreement to execute works at specified rates and times, and held responsible for procuring sufficient labour.¹

Accounts.—In 1864 the workshop accounts were remodelled in order to show whether the institution was working at a profit or a loss.

There was insufficient work to keep the staff and machinery fully employed, and in 1870 the practice of making an annual grant to cover the yearly deficit was introduced.

Departments were debited only with the actual cost of labour and materials, and the grant was intended to cover all working expenses (coal, superintendence, labour, and contingent expenditure).

The method of calculating the cost of each item of work was intricate, and the check and verification of accounts was difficult. The profit shown under this system was indeed entirely fictitious. In reviewing the accounts of 1876, the municipal auditors made some suggestions, which were adopted by the Commissioners,² and in 1881 a committee was appointed

¹ A more detailed account of the internal economy of the workshops will be found in the *Engineering Manual* of the Corporation, prepared by Mr. S. C. Mitter, District Engineer II.

² Corporation Proceedings, 25th April 1877.

to investigate the system then in force. As a preliminary measure, stock was taken and large deficiencies were found.

A special establishment was appointed to examine the accounts of the two preceding years, and it showed that in many cases work had not been billed for, while in other cases no charge for the use of plant had been made. The permanent accounts branch attached to the workshops was accordingly strengthened, and a charge of 20 per cent. on the cost of labour and materials was debited against departments on account of supervision and plant.

Working expenses, and the value of the work as thus estimated, were then found to be in practical equilibrium. The percentage charged for 'profit' was subsequently raised to 25.

In 1908-9 a profit and loss account, compiled by the Chief Accountant with great care, showed a small profit after allowing for depreciation, rent, rates, and similar charges—a satisfactory result considering that the prices charged are decidedly lower than the market rates.

Additions and Improvements.—Large purchases of machinery and engines were made in 1876-77, between 1890-93, and again in 1903-4.

In 1879 the locomotive shed was completed, the foundry was enlarged in 1886-87, and the accommodation increased in 1892-93. These additions and improvements cost over Rs1,33,000.

Recent Statistics and Developments.—With the increase in municipal services, the demands on the workshops for every class of work has continually grown. In 1913-14 the value of the work turned out amounted to Rs4,37,000 as compared with Rs3,28,000 in 1911-12. The increase in road work accounts for an increase of Rs20,000 in the charges for repairs to steam rollers in 1913-14, as compared with the charges for the previous year.

Five hundred and ninety-five tons of castings were turned out in 1913-14, as against 507 tons in 1912-1913.

The result of the working for 1913-14 was a net profit of Rs42,447.

Additions to the plant have recently been made to cope with the increased demands on the workshops ; in 1913-14 it was decided to install an improved triple-gearred surfacing lathe, which will turn out locomotive and wagon wheels, and render it unnecessary to purchase new wheels and axles from outside sources.

KOTRUNG MANUFACTORY AND BRICKFIELDS

In 1858, when arranging for the execution of the drainage works, the Commissioners found the supply of sufficient bricks of proper quality to be so variable and precarious, that they decided to acquire and work a brickfield of their own.

The *chur* at Kotrung, 1½ miles north of the Bali Canal, was selected as the most suitable site for the brickfield ; its chief advantages were proximity to the town, the character of the soil, and its facilities for water conveyance. The land was acquired under Act VI. of 1857, at a cost of over Rs75,000,¹ and brick-making commenced on the 1st January 1858. Possession was shortly afterwards obtained of a contiguous plot of high land for the erection of buildings and machinery, and a careful survey of the whole property, which had an area of 275 bighas, was made. The works at Kotrung were considerable, comprising an engine-house, a boiler-house, two machine sheds, a chimney 83 feet high, a soorkhi mill-house, six drying-sheds, two workshops, a bungalow for the engineer, and another for the superintendent of works, a bridge over the canal, barracks capable of lodging about 600

¹ The Commissioners' Report of 1861 on the Drainage Works states that the land at Kotrung 'in the aggregate, stands in at a cost of Rs66,582,' *vide* p. 13 *ibid.* Page 7 *ibid.* states that the cost of Kotrung and the Beliaghata site was Rs80,419. We know the cost of the land at Beliaghata was Rs4551, which leaves a sum of Rs75,868 as the cost of Kotrung. I take the latter figure, which appears in the body of a formal statement of accounts.

coolies, and a shop for supplying the latter with stores. The buildings cost over Rs55,000. Six thousand feet of tramway were, also laid on the brickfield for conveying mud, bricks, coal, etc., to the machines. The machinery consisted of a 25 H.P. steam-engine, soorkhi mills, brick-making machines, a circular saw-table, a self-acting lathe, etc.

In 1861 the Commissioners valued their Kotrung property, inclusive of buildings and plant, at about 2½ lakhs, and although in 1874, when the drainage works were almost completed, no offer to purchase the property was received, there can be no doubt that the original outlay was thoroughly justified by the quality and efficient execution of Clark's important works. The subsequent history of the Kotrung property is not inspiring reading, and need not be told in much detail.

Brickfields leased out.—In 1868 the brickfields were leased to Messrs Burn and Co., who paid a royalty of 8 annas for every 1000 bricks manufactured. In 1879 the burning of bricks by a new pattern of trench kiln, invented by a Mr. Bull, was introduced, the inventor being paid a royalty of 4 annas per 1000 pucca bricks.

In 1882 the property was leased to Messrs. Mitchell and Co., who paid a monthly rental of Rs750, and were bound to supply materials to the Corporation at fixed rates. The property was next leased to Messrs Nilkamal, Mitter and Sons, who took possession towards the end of 1884. The new lessees applied in the following year for the termination of their lease, and the property was without success put up to public auction, with an upset price, in 1886.

The settlement of accounts with the last lessees occupied some time, and the brickfield in the meanwhile lay idle. Between 1889 and 1891 the property was leased at a rent of Rs5000 per annum, although no formal lease was executed; in 1892 an offer to purchase the brickfields for Rs85,000 was refused, and in the same year they were leased for five years, at an annual rental of Rs7400, to Messrs T. C. Mookerjee and

Co., who subsequently obtained a new lease for ten years from the 1st September 1906, at a rent of Rs10,600 per annum.¹

¹ *Vide* Proceedings of Corporation and General Committee for 1892. The following sources may also be referred to for the history of the Kotrung leases :—

Administration Report for 1881, paragraph 89.

Corporation Proceedings 3rd December 1885.

“	“	28th March 1889.
“	“	9th May 1889.
“	“	6th June 1889.
“	“	14th August 1890.
“	“	24th March 1891.
“	“	2nd May 1895.

Proceedings Town Council and General Committee 23rd February 1889.

“	“	“	23rd March 1889.
“	“	“	30th March 1889.
“	“	“	11th May 1889.
“	“	“	5th July 1890.
“	“	“	10th February 1891.
“	“	“	29th March 1895.

CHAPTER XI

TOWN HALL AND SQUARES

Town Hall.—‘The first Town Hall, or Old Court House, stood at the northern end of the street which at the present day derives its name from it. . . . For many years this building was the venue of the social gatherings of those olden times, till in the year 1791 it began to show signs of insecurity. In fact, the decay seems to have been so apparent that the Government ordered its demolition, and it was accordingly pulled down in 1792.’¹

On the 5th November 1793 the inhabitants of Calcutta, at a public meeting, voted a statue to Lord Cornwallis, and in 1804 they decided that a statue of Lord Wellesley should be set up. Two committees were formed, but it then occurred to some one that marble statues would quickly deteriorate in the Calcutta climate, and it was proposed by means of public lotteries to construct a Town Hall, in which these and similar statues might be erected. Government approved of the suggestion, and nominated certain persons to act with the public committees, which were amalgamated into the *Town Hall Committee*.

The Town Hall was erected on the site of a house in which Justice Hyde lived, and was completed in 1814, at a cost of Rs7 lakhs.

It remained in charge of Government for fifty years, and was in 1864 transferred to the Justices, the proprietary right in the building and furniture being made over to them with the sole and uncontrolled management thereof. The transaction was ratified by section 20 of Act IX. of 1867. The Town Hall was equipped, repaired,

¹ *Bengal Past and Present*.

and decorated between the years 1866-70, at a cost of over 1 lakh of rupees, and in 1896-97 extensive alterations and repairs were executed, at a cost of nearly 1½ lakhs. In 1901-2 the valuable portraits, which from time to time had been presented for the Town Hall,¹ were renovated at a cost of Rs5500.

In 1909-10, when the building was pronounced unsafe, Government made proposals for its retransfer to the State at a valuation, with the intention of utilising the site.

It was intended that the Corporation should construct a new Town Hall on another site. The cost of the latter scheme would however have been great, and the plans of Government were subsequently entirely changed by the transfer of the Imperial capital to Delhi. The Corporation then decided to improve and strengthen the building, and a committee of experts carefully examined the whole question in 1913-14. Designs and estimates amounting to Rs2,01,758 were prepared by the City Architect, approved by the Committee, and sanctioned by the Corporation, which at this time of writing awaits the sanction of Government. I am indebted to Mr. Ballardie, City Architect, for the following account of the architectural features of the Town Hall :—

‘The Town Hall is a massive two-storeyed structure, treated externally in the Roman Doric style, the order being carried through the two storeys. The entrances, which are on the north and south fronts, are protected by massive hexastyle porticoes, and are approached by wide flights of steps, the south elevation being treated with considerable breadth and dignity.

‘On plan the building is a rectangle having a fine hall on each floor extending from east to west, the various anterooms and retiring rooms being situated on the north and south sides. The utility of both storeys is unfortunately greatly marred by the close proximity of the supporting columns, which practically divide each floor into three separate halls. It is clear that the

¹ A list of the portraits, busts, and statues in the Town Hall and the Municipal Office buildings is given in the Corporation Almanac.

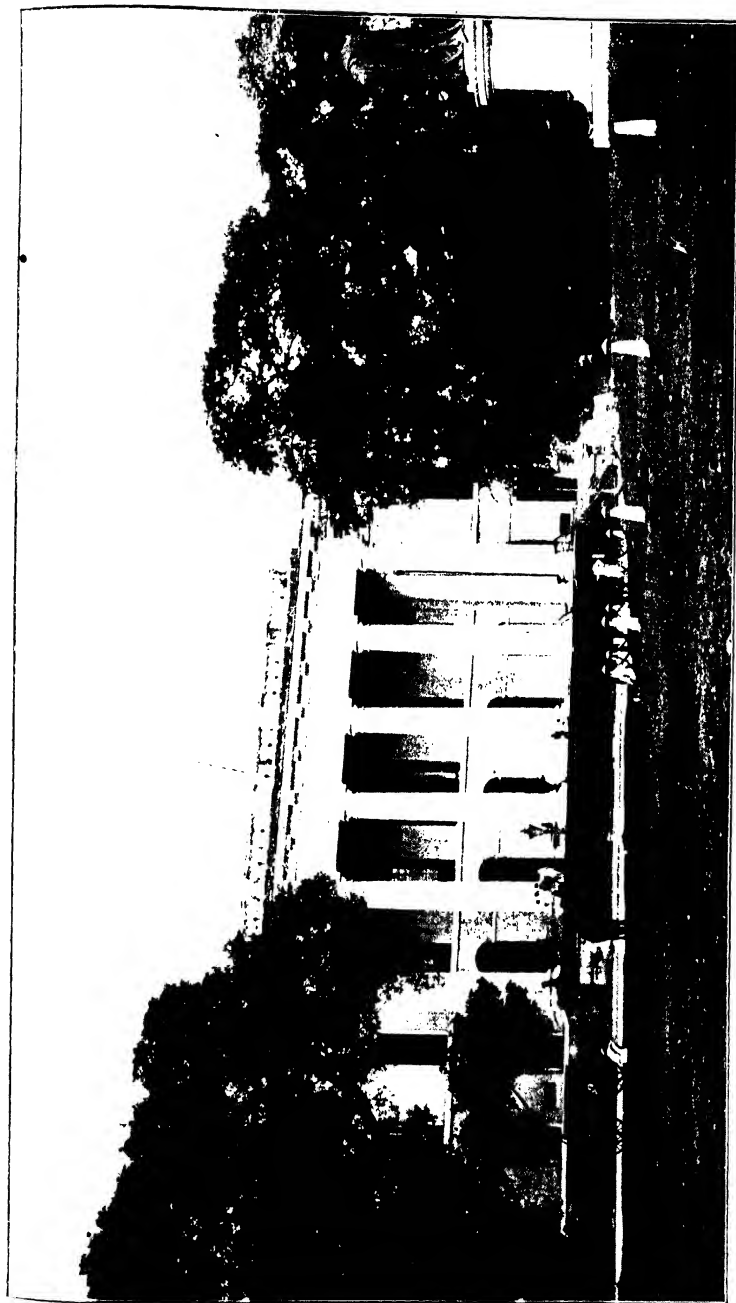


Photo by Bourne & Shepherd, Calcutta

architect or engineer was not prepared to place great reliance on the materials at his disposal.

‘The internal treatment on each floor is more or less similar, being a free rendering of Ionic, the plaster details showing a trace of the influence of the Brothers Adam. The main staircase, which is on the north side, is symmetrical with the axis of the building, and ascends in two broad flights to the upper floor, its very size giving it a dignity which a little more definite architectural treatment would have greatly enhanced.

‘The building is perhaps more interesting from an historical than from an architectural point of view, but forms a dignified setting for the many fine paintings which have been gathered together within its walls.’

The Corporation charge rent from the public for the use of the Town Hall at the following rates :—

1. One day	Rs40
Subsequent days (successive)	25 per day.
2. One night	80
Subsequent nights (successive)	50 per night.

The charges for lighting are made at the rate of Rs5 per 1000 cubic feet of gas (as ascertained by meter), and a fixed sum of Rs5 for labour charges per night. A sum of Rs50 must be deposited in advance for lighting charges ; and the balance of the money is refunded or excess is charged according to the readings of the meter.

Besides these amounts a charge of Rs8 a night is made on ordinary occasions for police, and a charge of Rs16 under the same head on special occasions (balls, etc.).

Central Municipal Offices.—In 1848 the office of the Commissioners was located at No. 11 Esplanade Row, which was leased at a monthly rent of Rs300.¹ A year or two later premises No. 3 Chowringhee Road were engaged at the same monthly rate of rent. But this accommodation before long became inadequate to the growing needs of the Municipality, and valuable stores had to be kept at different places—such as Chandpal Ghât, Bonded

¹ The first meeting of the Commissioners under Act XVI. of 1847 was held at the Town Hall on the 20th January 1848.

Warehouse, Beliaghata and Kotrung depots, and the Gowkhanas. This caused great inconvenience and waste, and in 1860 the Justices secured the commodious premises No. 1 Chowringhee Road, to which a large compound and out-offices were attached, for a monthly rent of Rs500. This arrangement lasted till 1872, when the Justices resolved to construct a suitable municipal office at a cost of about 1 lakh of rupees, exclusive of the cost of a site. The old Municipal Offices, round which the present building has grown, were designed by Mr. Osmond of Messrs. Mackintosh, Burn and Co., and were constructed at a cost of Rs1,91,000, including Rs65,000 for the land. Towards this expenditure nearly Rs47,000 were provided from the legacy left to the town by Mr. Marcus, and Rs1,30,000 were advanced by Government. In 1885-86 the building was enlarged at a cost of Rs22,000, and in 1901 the whole building was entirely remodelled and greatly extended. The total cost of the building has amounted to about Rs5,90,000, and proposals have been recently made for its further extension. Over Rs80,000 have been spent on equipment. The property, including the site, is now valued at about Rs13 lakhs. The building provides the following accommodation :—

- (1) Offices of the Chairman, the Vice-Chairman, and the Deputy Chairman.
- (2) Offices of the Chief Engineer, Health Officer, District Engineer and Health Officer of District III., Secretary, Collector, License Officer, Solicitor, Lighting Superintendent, and Chief Accountant.
- (3) A council chamber in which meetings of the Corporation are held.
- (4) Two committee rooms.
- (5) A waiting-room for the Commissioners.
- (6) Office of the Registrar, Hackney Carriages.
- (7) Secretary's quarters.

District Offices, etc.—In addition to the Central Offices in Corporation Street, the Municipality possesses three ¹

¹ The offices of District III. are located in the central municipal office buildings.

district offices in which the Engineers, Building Surveyors, and Health Officers of Districts I., II., and IV. are housed with their staffs.

A list of its other properties (Ward Offices, Birth Registration and Vaccination stations, Gowkhanas, Markets, etc.) will be found in the Corporation Almanac (pp. 19-22), a useful compendium of municipal information printed each year at the Corporation Press. Excluding surplus lands available for sale, squares, burial-grounds, burning-ghâts, and crematorium, and also properties outside municipal limits (such as the Pulta, Tollah or Kotrung properties), the immovable property of the Corporation is valued by the Assessor at over Rs150 lakhs.

Squares, general.—Calcutta is wanting in the extensive and beautiful parks which most large Western cities have reserved or acquired for the public good. The Maidan, of which Calcutta is justly proud, was in the early part of the last century jealously preserved from encroachment by the military authorities; the Eden Gardens, which provide Calcutta with its most popular evening promenade, were laid out at the cost of Government, and numerous squares, consisting usually of large tanks surrounded by well-kept walks, have been acquired from time to time and dedicated to the public by the Corporation. But apart from the need of spacious thoroughfares, the chief desideratum of Northern Calcutta is perhaps a park of ample dimensions; Dalhousie Square, the largest in Calcutta, is only 16 acres in area, while none of the northern squares are more than promenades. Calcutta owes such squares as she has largely to her more imperative need of a water supply. In the first half of the nineteenth century many large tanks were excavated in the heart of the city to provide wholesome drinking water, and were subsequently, when the Pulta Waterworks had been established, converted into 'squares.' The original cost of excavation was in each case heavy, in spite of the abundant cheap labour which was available.

Excavation of Public Tanks.—The oldest tank is in Dalhousie Square (formerly called Tank Square); it was

excavated probably in the middle of the eighteenth century 'by order of Government, to provide the inhabitants of Calcutta with water.' Next in age are those in College Square, Cornwallis Square, Wellington Square (formerly called the Beparitola Tank, and latterly converted into a covered reservoir of filtered water), five ¹ tanks in Mr. Camac's estate in Short's Bazar, Wellesley Square, and Mirzapore Square. These reservoirs were all constructed by the Lottery Committee between the years 1817 to 1836. No tanks were excavated during the next twenty years, and only two—namely Triangular Square (formerly called Dunkin Bustee Tank and now called Allen Square) and Victoria Square Tank (formerly called Bamun Bustee Tank)—were constructed during the régime of the Improvement Commissioners between 1856 and 1863, as part of a joint bustee improvement and water supply scheme. The tank known as Blacquire Tank ²—named after Mr. W. C. Blaquiere, who landed in Calcutta in 1771, was for sixty years a police magistrate, and died in 1853 at the age of ninety-four—was constructed sometime before this period,³ but the exact year is uncertain. No new tanks have been excavated since 1863; but Mirzapore and Blacquire Tanks were re-excavated in 1866. We have seen that in 1820, before the introduction of filtered water into Calcutta, the Lottery Committee set up an engine at Chandpal Ghât, which pumped water from the river into two reservoirs, whence it was distributed by masonry aqueducts. The aqueduct system was linked up with the public tanks, which depended mainly upon this source for their supply during the dry season. Tank Square alone was connected direct with the river.

On the introduction of the filtered-water supply in 1867, tank water was no longer required for drinking purposes,

¹ The modern names of these tanks are Jhow Tank (lately renamed Minto Tank), Auckland Square, Goristan Tank, Panchkotia Tank (since filled up), and Short's Bazar Tank. Camac's estate in Short's Bazar, which comprised 264 bighas of land, was acquired by the Lottery Committee at a cost of Rs2,64,000, and possession taken on the 2nd October 1820.

² Since filled up.

³ Proceedings, 21st January and 11th February 1852.⁴

and the tanks with the promenades surrounding them were converted into 'squares' or gardens. The following tanks have been filled up within recent years :—

- (1) Blacquire Tank, 1887-88.
- (2) Sarup Poddar's Tank, 1904-5.
- (3) Masjid Tank, 1905-6.
- (4) Triangular Tank (Allen Square), 1905-6.
- (5) Mirzapore Tank, 1905-6.
- (6) Panchkotia Tank, 1909-10.
- (7) Bartola Tank (site of the Allen Market).

During the decennial period ending 1910-11, the following public squares were opened :—

- (1) Shaw Square,
- (2) King Square,
- (3) Woodburn Park,
- (4) Kenderdine Square,
- (5) Kumartoli Square,
- (6) Greer Park,
- (7) Ekbalpore Square,
- (8) Jorabagan Square,

while two vacant plots of municipal land were dedicated to the public as Convent and Market Squares.

It would be tedious to give a detailed account of the origin of each square,¹ but we may refer briefly to those which have some historical interest.

Allen Gardens.—This square has been formed by filling up Triangular Tank, which was excavated as a part of the Dunkin Bustee Improvement Scheme in 1859 (*vide* BUSTEES). The tank covered about 4 bighas, and was filled up in 1905-6 at a cost of Rs10,000.

Beadon Square.—This square, named after Sir Cecil Beadon, Lieutenant-Governor of Bengal, was laid out as a public promenade for Northern Calcutta during the years 1867-70. A sum of 2 lakhs of rupees was originally voted for the scheme, but the net cost after the sale of surplus lands amounted to about Rs2,64,000.

College Square.—The tank, known as Goledighi, was

¹ A list of squares will be found in the Corporation Almanac, p. 41.

excavated by the Lottery Commissioners between 1817 and 1836. In 1869 the tank was re-excavated, and its supply replenished from the aqueducts.

In 1906-7 the square was much improved at a cost of Rs10,000, half of which Government contributed, in view of the fact that the buildings on two sides are Government institutions.

Convent Square was laid out in 1907-8 on the site of the old Entally Gowkhana. Formerly the property of the Suburban Commissioners, the land, about 5 bighas in area, vested in the Corporation after the amalgamation of 1889, and was made a public square on the petition of the residents of the locality.

Dalhousie Square.—The tank appears to have been excavated by Government about the middle of the eighteenth century ; it was deepened in 1783-84.

In 1865 Tank Square was transferred to the Justices, and renamed Dalhousie Square. During its forty years of management the Municipality effected several small improvements ; *malis'* quarters were constructed, the drainage improved, a tennis court and nursery laid out, and public necessities provided. In 1905 the Corporation agreed to transfer the square again to the Government of Bengal, on the following conditions :—

- (1) That the square should remain open to the public.
- (2) That its area should not be at any time curtailed.
- (3) That the Chairman of the Corporation and the President of the Public Squares Committee should be associated with Government in its management.

Government has since made extensive improvements to the square.

Before transferring the property to the Justices in 1865, Government gave permission for the Dalhousie Institute to be erected inside the square, and the building was completed in 1865. This structure is a blemish on its surroundings, and obstructs the fine vista opening up from the northern main entrance of Government House.

Harakumar Tagore Square, in Corporation Street, was laid out in 1886-87.

A portion of the site was presented for the purpose by the late Maharaja Bahadur Sir Jotindra Mohun Tagore, K.C.S.I., after whose father the square was named.

Jorabagan Square.—Its site was notorious, as one of the most congested and insanitary areas of the town. In 1903 the Corporation decided to acquire a large portion of the bustee, and to convert the site (about 6 bighas in area) into a public square. The scheme was executed in 1906-7 at a cost of nearly 2½ lakhs of rupees, and there can be no doubt that the expenditure has been amply justified.

Kenderdine Square is a small and little known square, in a most congested quarter (Kenderdine Lane); a portion of the land was presented to the Corporation, in 1902 by Babu Scwkaron Das Goenka, a wealthy and public-spirited Marwari, and the area was increased by an expenditure of Rs45,000 from municipal funds.

Marcus Square.—Mr. G. T. Marcus, a Calcutta citizen who died in England in 1864, bequeathed to the Municipality, for the benefit of the town, certain valuable Calcutta properties, subject to the payment of an annuity of £250 during her lifetime to his sister Mrs. Thornton. The property realised Rs1,17,000, of which Rs47,000 was utilised for the construction of the Central Municipal Offices, and Rs70,000 invested in Government securities to provide Mrs. Thornton's annuity. This lady died in 1883, and Rs72,200 was then made over to the Commissioners by the Administrator-General. It was decided to devote this fund to constructing a new square. Bysakh's Dighi in Machuabazaar Street was acquired in 1887, and the square, about 9 bighas in area, with a small central tank, was opened to the public in 1889.

In 1894 Sir Charles Elliott, Lieutenant-Governor of Bengal, desiring to promote physical culture among the student community, made the following proposals to the Commissioners for improving the square :—

- (1) To fill up the tank ;
- (2) To acquire additional bustee lands on the west, about 4½ bighas in area ; and

- (3) To vest the management of the square in a committee representing the Municipality, the Bengal Government, the Society for the Higher Training of Young Men, and the Calcutta University. The scheme cost Rs97,000, of which Rs50,000 was contributed by Government and the balance by the public. The new square was formally opened on the 12th December 1895.

Paddapukker Square (Kidderpore) does not belong to the Municipality. It was leased in 1892-93 from the Matwali of the Hughli Imambara for an annual rental of Rs600 for a period of twenty-five years.

Between 1893 and 1898 the Corporation spent about Rs18,000 on its improvement.

Victoria Square was laid out in connection with the Bamun Bustee Improvement Scheme (*q.v.*). Its improvement cost the Municipality about Rs25,000.

Woodburn Park covers the site of the old Kasiabagan Burial-Ground, which was given as a *wakf* to the Muhammadan community by Nawab Saadat Ali Khan Bahadur, the last independent ruler of Oudh. The burial-ground was about 37 bighas in area, and different portions were used for the burial of Muhammadans and low-caste Hindus.

It was closed in July 1858 on sanitary grounds, and the Commissioners provided another cemetery at Tiljola, at a cost of Rs4272.

In 1888 the Muhammadan Burial Board moved the Chairman of the Corporation for preserving the old burial-ground from encroachment and defilement and for its decent maintenance, but nothing was done until 1896, when it was proposed to acquire the land and reserve it as an open space. Government claimed that the property had vested in itself, and sued one Fazlar Rahman, who was in possession of a portion of the site. The suit however was compromised, Fazlar Rahman being left in possession of about $12\frac{1}{2}$ bighas, and the remainder being made over to Government (1901). In 1903 the land was made over to the Corporation to be converted into a public square, and Woodburn Park Road was constructed in 1905-6.

The square (19½ bighas in area) was fenced in, but it was only in 1913-14 that a comprehensive scheme of improvement was prepared; the Park is to be laid out as a garden on the lines suggested by Mr. Lane of the Royal Botanical Gardens (Sibpur).

Maddox Square has been recently opened out in connection with the Hazra Road Improvement Scheme. In 1913-14 the land—9 bighas in area—was being raised, and it was expected to be brought into use in the following year. The Improvement Scheme, under which over 70 bighas of low-lying land were acquired, raised, and laid out, so as to provide land for a dhobikhana, a square, and for building sites opened up by new roads covering 12½ bighas of land, cost over 5 lakhs; about half the surplus lands available for sale have been disposed of, at prices which indicate that the full cost of the scheme will be more than recouped.

Control of Squares.—For many years it has been the custom to entrust the charge of a square to some substantial resident in its vicinity, who took an interest in gardening. In 1909-10 the general control was vested in the District Committees, but the old practice is still followed in the case of many squares. Proposals for the appointment of a Squares Superintendent have been made from time to time, but have hitherto been shelved.

The Improvement Trust has agreed to allot 10 lakhs of rupees for the construction of new squares, and it seems likely that when these have been opened out, the appointment of a Squares and Roadside Trees Inspector will be considered necessary. The Corporation at present expends about Rs20,000 per annum¹ on the upkeep of squares and roadside trees.

Those squares which are suitable for games (football, cricket, etc.) are quite inadequate for the numerous school clubs of Calcutta, but the privilege of using them is divided amongst the applicants as evenly as possible by the District Committees. The use of squares by the public is regulated by bye-laws, which were passed in May 1907.

¹ The expenditure shows a tendency to grow. In 1914-15 it amounted to nearly Rs44,000, as against nearly Rs30,000 in 1913-14.

CHAPTER XII

SURVEY AND CENSUS

Survey.—A full and interesting account of the topographical history of Calcutta, reconstructed for the earliest period from written records, and based from 1742 upon maps still extant, may be found in Beverley's admirable pages, from which the following account of surveys of the town is taken.

William Baillie's map of 1792 (reduced from an original executed to the scale of $26\frac{1}{2}$ inches to the mile by Lieutenant-Colonel Mark Wood in 1784-85) included the ground and new buildings at Chowringhee, south of the Burial-ground Road (Park Street), which had been accurately surveyed the year before. It is a map of the old town proper, with its eighteen wards, as it existed in 1876 prior to the amalgamation of 1888.

The streets were named and marked out for the first time, and the town boundaries, as defined by the Proclamation of the 10th September 1794, are clearly shown. The boundary on the eastern side is the Mahratta Ditch, which is shown as running round Calcutta to the junction of Circular and Chowringhee Roads. 'The European quarter extended from Esplanade Row to Armenian Street, and inland as far as Chunaritola and Chandney Choke. Besides this, Europeans seem to have occupied both sides of Bow Bazaar Street and Dhurrumtolla, as far as the Circular Road, as well as the west side of Circular Road between Jaun Bazaar Street and Park Street. . . . Taltola (called Talpooker), Colinga, and Fenwick Bazaar are occupied almost entirely by natives. Chowringhee (south of Park Street) is represented as a paddy-field, by which name indeed—Dhan Khet—it long continued to be known.'¹

In 1794 A. Upjohn published his map of 'Calcutta

¹ Beverley's *Census Report*, 1876.

and its environs, from an accurate survey taken in the years 1792 and 1793.' It is drawn on a scale of nearly 8 inches to the mile. Between Tank Square and Mission we find only five houses, but the wealthier Europeans have already begun to leave the area, which is now known as the commercial quarter. A new suburb had sprung up at Sealdah and Entally, Circular Road on both sides was studded with large houses, and at Chowringhee (in Beverley's phrase) a 'West End' was rapidly coming into existence.

The next survey of the town was made by Major Schalach in 1824, under the auspices of the Lottery Committee. His primary object was to ascertain the levels of the city and the most efficient mode of draining it. His map,¹ published in 1825, is 'on a scale of 9 $\frac{3}{4}$ inches to the mile, and is drawn with remarkable clearness and accuracy. . . .

'Old Calcutta now appears thickly populated, the streets being mostly lined by continuous rows of houses. . . . But the pukka buildings, especially in the north of the town, grow fewer in number as we move inland, very few such buildings being shown east of Cornwallis Street. . . . In the southern quarter of the town there has evidently been a great increase of pukka houses since 1794.'²

The next survey was made in 1850 by F. W. Simms, Consulting Engineer to the Government of India. His map, which is drawn to the scale of 100 feet to the inch, comprises the old town, with its eighteen wards within the Mahratta Ditch, like the maps of Baillie and Upjohn, and forms the basis of all later maps of Calcutta. Beverley's³ map of 1876 merely contains an addition of 41 acres, due to accretion from the river in the northern ward.

Survey of 1894-95.—In 1884-85 the Municipal Commissioners decided that a complete survey of the town had again become necessary, and Government was asked for financial assistance. Legislation was considered necessary, and Act I. of 1887 was passed.

The survey operations were in charge of Lieutenant-

¹ The Corporation possesses a copy of Upjohn's map, an incomplete copy of Schalach's map, and a complete set of Simms' sheets.

² Beverley's *Report*.

Colonel Barron ; he made an independent traverse, which was connected to the Ochterlony monument as origin ; the maps, on a scale of 50 feet to an inch, were designed to show roads, footpaths, lanes, aqueducts, tanks, huts, buildings, sewers with their lampholes, manholes, ventilators, etc., water supply pipes, and engine-houses, reservoirs, standposts, hydrants, and lighting and telegraph works with their accessories. The boundaries of all municipal properties were marked with stones.

The work was completed in 1894-95, the Corporation contributing Rs58,650 towards the cost (Rs2,38,063 in all).

Survey of the Added Area.—In May 1894 the Suburban Improvement Committee proposed that the Survey Act I. of 1887 should be extended to the added area, of which a survey might then be made.¹ Government did not consider that its own interests would be in any way served by such a survey, and was therefore not prepared to afford any financial aid ; the Corporation accordingly dropped the proposal. It was however revived in 1901, and Government then agreed to pay two-sevenths of the entire cost, which was estimated at Rs1,68,360, on the following conditions :—

- (1) That a cadastral survey be made of the whole area.
- (2) That a record be prepared in a form approved by Government, and be subject to check by the Collector, 24 Parganas.
- (3) That the boundaries and serial numbers of holdings be clearly marked upon the maps.

The work was commenced by Mr. R. B. Smart, under the superintendence of Major R. T. Crichton, C.I.E., I.A., in August 1903, and completed in 1906-7, at a cost of Rs1,91,960. The maps were drawn on the scale of 50 feet to an inch, and showed an area of 8514 acres.

In addition to their contribution of Rs1,20,258, the Corporation spent nearly Rs50,000 in maintaining a special establishment to watch municipal interests in cases of dispute, and to erect municipal boundary stones.

¹ A survey of the Suburban Area had been made by Billon in 1871-72, to the scale of 99 feet to an inch ; the Corporation possesses a complete copy of this map.

The value of this important survey is beyond question, but the rapid transformation of suburban Calcutta in recent years has tended, in the absence of any scheme for recording changes, to render even this recent survey out of date. The revision of the maps of the town area, which cover 193 sheets, was commenced in March 1909, and took three years to complete.

The cost, Rs46,682, was shared equally between Government and the Corporation.

The printing of the maps of the added area, which covered 394 sheets, was not completed until 1909-10, and the maps had already by then ceased to correspond accurately with the changing face of the suburbs.

The problem of maintaining the Survey maps thus engaged the attention of Government and the Corporation, and in 1910, after different schemes had been considered, it was decided to employ for the purpose a permanent staff, at a cost of Rs6996 per annum, the charges being divided equally between Government and the Municipality.

This scheme however was subsequently abandoned, as it was found that a new traverse of the suburban area had become necessary. No steps were taken to revise the maps of this area until 1913, when the Improvement Trust undertook to defray the cost of the revision,¹ which is expected to be completed at the end of 1915-16.

In September 1915 the Corporation agreed to pay Rs2000 per annum towards the cost of a new scheme of maintenance for the town and added area, provided that the Government and the Improvement Trust pay the balance, viz. Rs4000, of the annual estimated cost. The scheme provides for a small permanent maintenance staff, supervised by the Government Survey Department, and working in co-operation with the municipal assessment and survey branch.

CENSUS

Early Estimates.—Hamilton, who visited Calcutta in 1710, estimated its population at 10,000 to 12,000 persons.²

¹ Amounting apparently to nearly Rs70,000.

² This account of the early attempts at computing the population of Calcutta is taken from Beverley and from Mr. A. K. Ray's *Short History of Calcutta*.

In 1752 the population was estimated at 409,056 by Holwell, who appears to have had the houses counted within a certain area ; he then by simple arithmetic calculated the average size of a holding, and relying on this ratio arrived at the total number of houses within the limits of the town.

The area of 5472 bighas, in which no doubt some count of houses or holdings had been made, contained 9451 'pottas or houses,' which gives 11 kothas as the average area occupied by each potta-dar ; Holwell by some curious error or confusion *inverted* the arithmetical process, and *dividing the number of houses* (9451) *by the number of bighas* (5472), obtained the erroneous figure of roughly $1\frac{3}{4}$ bighas as the area covered by each house. The area of the remaining portion of the town, for which he had no information, was estimated at 3050 bighas, which 'calculated agreeably to the foregoing proportion,'¹ should really contain 5267 houses.

He proceeds however no further on this basis. Pursuing this method and taking eight (as he does) to be the average number of persons to a 'house' or holding, he would have arrived at the following figure :—

$$5267 + 9451 = 14,718 \text{ houses,}$$

$$14,718 \times 8 \text{ (persons per house)} = 117,744 \text{ persons,}$$

which estimate would perhaps not have been far wide of the mark. Holwell however before reaching this conclusion, abruptly abandons his original method and introduces entirely new factors.

He states that 'agreeably to the exactest judgment he can make, as well as the best information he has acquired,' each principle potta-holder of *one bigha* of land has five under-tenants.

The total area of the town, which he puts at 8522 bighas, would therefore be occupied by 51,132 families, or, taking eight to a family—'a very moderate estimate'—409,056 persons. All the authorities are agreed that Holwell's final estimate is greatly in excess of the actual population at that time.

¹ I.e. $\frac{9451}{5472}$.

Apart from his original error in arithmetic, which produced results that his experience led him to reject, he has apparently in his second method been tripped up by the want of a definition of 'house' or 'holding.'

Subsequent to Holwell's estimate, we have several statements as to the population of Calcutta, which however appear to be mere guesses, based largely on Holwell's figure. Thus in 1789 Grandpré states that the *Indian* population was about 600,000; in 1800 the Police Committee put the population at 500,000; in 1802 the Magistrates estimated it at 600,000; Sir Edward Hyde in 1814 gives it as 700,000; while in 1815 the *East India Gazetteer* thought that half a million would be 'a tolerably correct approximation to the real number.' In 1719 the assessors appointed to revise the assessments of the town, returned the number of premises at 67,519 and the resident population at 179,917 souls, but the influence of Holwell's estimate was still too strong for this estimate to be accepted, and the Magistrates, accepting as correct the number of houses given by the Assessors, made assumptions as to the average number of inmates in each house of certain standard types, and arrived at a total population of 230,552. *John Bull*, however, the popular journal of that time, did not accept this figure, which (it argued) took too little account of the moving population, which flocked to the town day by day without permanently residing there. Sirkars and peons were stationed at the chief outlets of the town to count the passengers, and the numbers entering the town daily were computed at 100,000 persons. In 1831 Captain Steel, Superintendent of Police, took a census of the population, and found that the town contained 70,076 houses and 187,081 inhabitants. His figures, though not in agreement with the popular idea, were corroborated by the census taken in 1837 by Captain Birch, his successor. He estimated the total population to be 229,714, of whom 144,911 or 63 per cent. were males and 84,803 or 37 per cent. females. The number of English was 3138, of Eurasians 4746, of Portuguese 3181, of Native Christians 49, while 137,651 of the balance were Hindus and 58,744 Muhammadans.

In 1850 a new estimate was prepared by Simms, based entirely on the number of houses found at the time of his survey. The inhabitants of 1036 native huts and 357 pucca houses were actually counted, and the average number of persons for each house of these two types was taken as 5 and 8·7 respectively. Upon this basis the population of the town proper (exclusive of Fort William and the jail) was estimated at 361,369 souls ; the method however was obviously empirical. In the same year the Chief Magistrate, who perhaps included Fort William and the shipping, made a census, which showed the population to be 413,182.

Importance of accurate Statistics recognised.—In the report for 1859 the Board of Commissioners wrote :—

‘ We believe that there is hardly any city in the civilised part of the world, in which its statistics are so very defective as in the British metropolis of India. What everywhere is considered of so much importance “ seems in India to have been looked upon as of comparatively little use ” . . . and the exact population of Calcutta remains at this moment a mystery. There is no official registry of births, marriages, and deaths, either European or Native ; there is nothing to afford an insight into the extent of the floating population ; there is no public record of arrivals and departures of Europeans ; there is no public return of the general causes of death.’

Census of 1866.—Legal provision for taking a census was first made in sections 101-108 of Act VI. of 1863, and the first systematic census, taken on the 8th January 1866, showed the population, including Fort William, Hastings, and the Port of Calcutta, to be 378,066 souls, of whom 239,380 were Hindus, and 113,365 Muhammadans. The number of ‘ Europeans ’ was returned at 11,224, the term apparently including Americans, Africans, and Australasians. The males composed 59 per cent. of the population. There were 16,022 pucca buildings and 43,575 huts.

The census was taken under the supervision of Baron Dowleas, Vice-Chairman to the Corporation ; there were 220 paid enumerators, and the cost of the census amounted to Rs21,548.

Prior to the counting, circulars were issued to reassure the people, pointing out that there was 'not the remotest intention to impose a fresh tax on the inhabitants, to interfere with their religion, or in any way to harass them.'

A great many of the returns were inaccurate and confused, and required revision by the enumerators, so that it was not until the 18th February that the preparation of statistical tables could be commenced.

Census of 1872.—The next census of Calcutta was taken on the 25th January 1872, in connection with the general census of British India in 1871-72. In 1866 Baron Dowleams reported that the inmates of ninety-eight houses had fled from Calcutta on the night of the census, and in 1872 a preliminary notice was published, setting out the advantages of a census. It contained the following encouraging statement :—'About six years ago a census was taken under the superintendence of the Justices of the Peace, from which no evil happened to anybody ; on the contrary, it was eminently useful in suggesting reforms.'

The census was taken by Mr. Chick, Registrar of Carriages and Boats, under the Commissioner of Police ; the total population, including Fort William, Hastings, and the Port, was placed at 447,601,¹ of whom 7265 were Europeans. The proportion of males was 66 percent. There were 20,443 pucca buildings and 18,421 huts ; the latter figure is however of no value, as it was based merely upon the assessment register and not upon actual enumeration.

Elaborate occupation tables, which Baron Dowleams had declined to undertake in 1866, were prepared at this census, but were considered utterly untrustworthy and valueless. The total cost of the operations amounted to Rs20,324, half of which was contributed by Government.

Beverley's Census, 1876.—The census of 1872 was taken in conjunction with the general census of India, and the requirements of the town itself were overlooked ; the requisite particulars, as Beverley points out, for a proper system of vital statistics and other details of municipal

¹ 633,009 including the suburbs, which were not yet part of the Municipality. The figures of this census were not regarded as accurate.

government were not recorded, and the census papers themselves were destroyed. The census in fact proved of very little use for municipal purposes, and Mr. H. Beverley, I.C.S., was appointed to take a new census of Calcutta in 1876. The enumeration was made on the 6th April, and showed the total population of Calcutta (including Hastings, Fort William, and the Port) to be 429,535, of which 278,224 were Hindus, 123,556 Muhammadans, and 23,885 Christians. There were 9093 Europeans and 242 other non-Asiatics, and 11,273 of mixed race. The percentage of males was 66.

There were 16,896 pucca houses and 22,860 tiled huts ; in the town proper 187,303 persons resided in pucca houses. The taking of the census in each of the eighteen wards was superintended by the Police Inspector of that section, and by a supervisor paid Rs50 per mensem ; there were originally 340 enumerators' blocks, subdivided finally to form 456 blocks ; the original enumerators were paid Rs10 each, and those appointed later Rs5 each ; in Fort William the garrison quartermaster was assisted by two native enumerators, while there were thirty-five enumerators for the Port. The total cost of the census, including supervision, enumeration, tabulation, and printing charges, amounted to Rs20,582, towards which the Port Commissioners contributed Rs1000.

Census of 1881.—On the 17th February 1881 a new census was taken, in connection with the general census of India ; Mr. Beverley, who was then officiating as Chairman of the Corporation, again superintended the operations, the preliminary work being carried out by the Surveyor and Assessor to the Corporation. The total population of the old town,¹ including Fort William and the Port, was 433,219 ; the population, including the suburbs, which were made part of the town in 1889, was 612,307. The number of pucca buildings in the town had increased to 18,107, and the number of huts had fallen to 20,667.

Census of 1891.—The next decennial census was taken on the 26th February 1891, as a part of the general census of India by Mr. Maguire, I.C.S. The operations

¹ With which Hastings had been incorporated in 1868.

covered the suburbs, which had been made a part of Calcutta by Act II. of 1888. The results of the census may be summarised as follows :—

Old Town	436,393
Added Area	213,008
Fort William—(a) Inside	3,468
„ „ (b) Outside	151
Port	26,589
Canals	2,102
Total ¹	<u>681,711</u>
Pucca buildings	25,949
Huts	47,276

In Ward 8 (Kolutola) the density of population was 226 persons to the acre, and in Ward 5 (Jorabagan) 161 to the acre ; in Wards 21 and 23 (Ballygunge and Alipore) it was only 11 to the acre. The census confirmed the conclusion reached in earlier and subsequent censuses, that the major portion of the population of Calcutta is not ' home-born but imported,' while the immigrants are mainly of the male sex.

Census of 1901.—The sixth regular census was taken on the 1st March 1901, under the superintendence of the Deputy Chairman of the Corporation, Mr. J. R. Blackwood, I.C.S. For the first time the work was carried out by an unpaid staff of enumerators, supervised by the Police Inspectors.

The results were as follows :—

Old Town	542,686
Added Area	266,283
Fort William	4612
Port	29,768
Canals	4,447
Total	<u>847,796</u>
Pucca buildings	47,284
Huts	96,859
	} including } suburbs.

¹ I am unable with the materials at hand to reconcile these figures with those in the Table given on p. 361, and at this time of going to press it is not possible to make a reference to India.—S. W. G.

The number of Hindus in the Old Town was 386,502, and of Muhammadans 152,200 ; the number of Europeans was 9567, and of Eurasians 12,127.

The density of population reached its maximum (281 per acre) in Ward 8, and was lowest in Wards 21 and 23, where it was 13 and 14 persons per acre.

The cost of the census amounted to nearly Rs68,000, of which Government contributed one half.

Census of 1911.—The seventh regular census was taken on the 10th March 1911, under the superintendence of the Deputy Chairman of the Corporation, the present writer. The total population of Calcutta (including Fort William, the Port, and Canals) was found to be 896,067¹ persons. The rate of increase which the two previous censuses had showed for the decade 1891-1901 had been more rapid, but the decrease would be explained by the fact that in the decade 1901-11 the population of the suburban municipalities outside the limits of Calcutta had increased about 45 per cent. The cost of the census was Rs37,430, of which the Corporation paid Rs19,143 and Government Rs18,287.

During the decade in question, the excess of deaths over births was 145,634.

The population however increased by 48,251, which added to the above figure gives the influx of immigrants, viz. 193,885, which must have occurred to produce these results. The average number of immigrants a year was therefore over 19,000. The early estimates of the population of Calcutta, and the census returns since 1872, are shown in the following Table :—

POPULATION OF CALCUTTA

ESTIMATES OF POPULATION PRIOR TO CENSUS OF 1872

1710.	12,000
1752. Holwell's estimate	409,000
1782. Mackintosh's „	500,000
1789. Grandpré „	600,000

¹ 607,674 males, 288,393 females.—Hindus, 606,382; Muhammadans, 241,587; Christians, 39,551; others, 8547. There were 14,297 of European or allied races, and 14,177 Anglo-Indians (or Eurasians). *

ESTIMATES OF POPULATION, ETC.—*continued*

1800. Police Commissioners' estimate .	500,000
1802. Chief Magistrate's	600,000
1814. Sir E. Hyde's	700,000
1815. East India Gazetteer	500,000
1821. Assessor's	230,502
1831. Captain Steel's	411,000
1837. Captain Birch's	230,000
1840. Simms'	361,000
1850. Chief Magistrate's	413,000

POPULATION FROM CENSUS OF 1872 TO CENSUS OF 1911

Town.	1872.	1881.	1891.	1901.	1911.
<i>Wards.</i>					
1. Shampooker .	28,848	28,511	36,885	46,887	53,036
2. Koomartooly .	34,024	25,682	26,614	30,155	33,073
3. Burtolla .	29,923	28,935	36,431	50,216	54,610
4. Sooker's Street .	25,036	24,405	34,828	42,034	48,112
5. Jorabagan .	39,076	36,318	39,180	49,069	52,114
6. Jorasanko .	36,029	32,824	41,657	52,988	59,541
7. Burrabazar .	23,503	20,769	20,646	31,574	30,495
8. Colootolla .	50,805	47,323	50,781	63,170	57,094
9. Moocheepara .	43,639	43,581	49,472	64,116	63,362
10. Bowbazar .	23,543	21,627	22,668	27,052	25,014
11. Paddapukker .	20,486	20,516	20,761	28,060	29,966
12. Waterloo Street	5,704	5,785	5,932	6,302	6,284
13. Fenwick Bazar .	26,787	25,898	28,366	31,208	28,436
14. Taltolla .	27,112	26,063	29,207	32,237	32,112
15. Collinga .	12,773	11,840	13,218	16,780	11,385
16. Park Street	4,566	4,968	4,620	6,110	5,294
17. Bamun Bustee .	6,568	6,125	4,598	5,454	3,125
18. Hastings .	5,153	5,115	4,820	5,919	5,550
19. Entally .	27,271	26,929	33,892	38,626	45,072
20. Beniapooker .	20,289	18,895	23,020	28,202	37,881
21. Ballygunge and Tollygunge .	23,329	20,423	22,831	27,207	39,952
22. Bhowanipur .	37,118	38,002	42,591	49,641	54,569
23. Alipore .	19,419	13,438	14,804	17,718	19,749
24. Ekbalpur .	18,074	15,869	15,340	21,608	21,869
25. Watgunj .	23,030	27,920	26,833	37,918	43,806
<i>Outside Municipal Area.</i>					
Inside Fort . .	...	2,942	3,468	2,893	} 4,411
Outside Fort . .	...	397	151	437	
Port	6,660	28,200	26,589	29,768	26,890
Canals	11,761	3,007	3,102	4,447	3,265
Total	633,009	612,307	682,305	847,796	896,067

There was also a special Census of Calcutta on the 6th April 1876, when the population was found to be 409,036 in the town under the jurisdiction of the Justices, 2803 in the Fort, and 17,696 in the Port.

The figures given in the above Table include the suburbs, which did not actually become a part of Calcutta until 1889.

VITAL STATISTICS

Early Measures.—The compilation of reliable statistics was first made the subject of legislation with Act XIV. of 1856, which directed the Commissioners to register 'the name, sex, age, religion, residence, and cause of death of every person, whose body is brought to any burial or burning grounds.'

No power was however conferred upon the Commissioners to enforce the submission of correct returns, and they were therefore, in regard to the mortality amongst the native population, dependent upon inaccurate returns furnished by the police, and indebted to undertakers for similar information in respect of Europeans.

In 1859 the Commissioners urged the necessity of rendering compulsory the registration of all deaths *and births*, and declared that the time had come 'when the appointment of a regular statist becomes highly desirable.' In their reports for 1860 and 1861 they again drew attention to the misleading and inaccurate character of statistics based upon voluntary registration.

Compulsory Registration.—The principle of compulsory registration was introduced by Act VI. of 1863, and steps were at once taken to establish six registration offices. Apathy on the part of the public was however inevitable, and constant prosecutions were necessary to secure respect for the law. In 1868 the Inspector of each Police Section was appointed *ex officio* registrar of all births and deaths occurring within his jurisdiction, but accuracy in the returns was still far to seek, although a useful check was found in the registers kept at the burial-grounds and burning-ghâts and in hospital returns. •

In 1880 twelve whole-time sub-registrars were appointed, and in 1887 the police were entirely relieved of registration work. In 1901-2, however, the Health Officer asserted that nearly half the births in Calcutta escaped registration. The Corporation at length accepted his proposal to appoint in one district eight peripatetic sub-registrars, and the gratifying results of this experiment led to the general adoption of the system throughout the town in 1906-7.

The Registration Department is also assisted by the Corporation Lady Health Visitor, the municipal midwives and vaccinators. In 1910 the posts of Vaccinator and Sub-Registrar were combined. There are also sub-registrars posted at each burning-ghât or burial-ground.

The compilation of accurate vital statistics, including inquiries into the causes of death, and their general relation to the sanitary conditions of the city, is now recognised as one of the most important functions of the Health Officer, and although there is reason to believe that the registration of births in different areas is from time to time incomplete and defective, the vigilant scrutiny of returns, and the check furnished by peripatetic sub-registrars, lead to the detection of negligent parents and guardians, and there can be little doubt that the statements annually prepared by the Health Officer leave little to be desired in the matter of accuracy and completeness.

Disproportion between Sexes in Calcutta.—The censuses of Calcutta from 1872 to 1911 show the number of females in Calcutta to be approximately only one-half the number of males,¹ and this disproportion has a remarkable bearing on the birth-rate of Calcutta. Another peculiarity is the large floating population in the city. In his report for 1906, the Health Officer observed that 'after making considerable allowances for defective registration

Year.	Males.	Females.
1872	407,742	225,267
1876	388,766	223,018
1881	393,453	218,854
1891	447,162	235,143
1901	562,596	285,200
1911	607,674	288,393

of births, it would appear that we have an unnatural decrease, and that the population is maintained and increased by wholesale immigration from rural districts.'

Infantile Mortality.—The death-rate amongst infants has always been heavy in Calcutta, as the following Table, covering each decade for the last forty-six years, will show:¹—

Year.	Number of Registered Births.	Deaths of Infants under twelve months old.	Deaths per mille of Births.
1866 . . .	4,970	1065	214
1870 . . .	5,251	1679	320
1880 . . .	7,552	2597	344
1890-1 . .	11,918	2392	202
1900-1 . .	10,773	4877	453
1910-11 . .	17,106	4679	274
1914-15 . .	17,386	4916	282

In 1902 the infant mortality reached the appalling figure of 491 per mille. In 1913-14 the male infant mortality was 292·2 per mille, and the mortality among female infants 256·5 per mille. The seriousness of these figures may be gauged from the fact that in Glasgow in 1911-12 only 171 boys and 131 girls died in infancy out of every thousand of each sex born.

In his report for 1913-14 the Health Officer of Calcutta, after pointing out that amongst infants who survive the first month, respiratory diseases—due largely in his opinion to the belief that in clothing infants 'a piece of string is ample protection in a tropical climate'—cause by far the greatest number of deaths, makes the following remarks:—
'The next group [of causes], premature birth and debility at birth, obviously depend to a large extent on economic and social causes, which act and react in a most complicated manner. Ignorance, with its attendant,

¹ It is not claimed that reliance can be placed upon the figures much prior to 1901; even now the registration of births is far from perfect.

barbarous midwifery, poverty, early marriage, and lastly the purdah system, which intensifies the effect of the insanitary environments common in the slums of the city, all help to swell the number of babies who only enter the world to leave it.'

A large number of deaths is due to *tetanus neonatorum*, 'a preventable disease due entirely to bad midwifery.' So far as the Health Officer is aware, 'it has never occurred amongst the hundreds of cases attended by the Corporation midwives.'

These midwives, however, were in 1913-14 called in to attend only 181 cases, 'though they could easily have attended eight times the number, even if called only once a day.'

The Health Officer has made arrangements for distributing small tin boxes, containing simple printed instructions, surgical scissors in aseptic metal cases, lint, sterilised silk ligatures, etc., to the *dhais*—the Mrs. Gamps of India—but sees little prospect of the general adoption of improved methods until midwifery is controlled by a Midwives Board.

Death-Rate generally.—The virulent diseases, such as small-pox, cholera, and plague, which constantly sweep over India, and the cataclysms of nature—cyclones and floods, with their attendant famine—would apart from other causes lead us to expect a higher death-rate than that prevailing in western countries.

In 1900 the death-rate per mille was 54, due chiefly to severe epidemics of plague and cholera. In 1910 the death-rate was only 28 per mille. In 1913-14 the death-rate, calculated on the population as given by the census of 1911, was 29·2 per mille; the death-rate amongst females was 39·4 per mille, as against a rate of 24·3 for males.

In Ward 24 the death-rate amongst females reached the terrible figures of 48·2 per mille. When it is remembered that in the United Kingdom the mortality amongst females is less than that amongst males, the Health Officer of Calcutta would appear to be justified in his statement that 'these figures constitute a terrible

indictment of the purdah system,' which condemns Indian women of the poorer classes to spend most of their time in the vitiated atmosphere of their houses.

The death-rate in Glasgow during 1910 was only 17·1 per mille.

The mortality of Calcutta has nevertheless diminished, subject though it has been through severe epidemics to more violent variations than are found in the statistics of European towns.

In 1866 there were 53·6 deaths per mille; in 1876 there were 29; in 1881 there were 30 deaths per mille; while in 1901 the percentage rose to 38·2 from 31·5 in 1891.¹ The following Tables, in which the figures can be relied upon with much more confidence, show the birth and death rates since 1900, and enable a comparison to be drawn with the rates of the other principal cities of India.

TABLE A
BIRTHS AND DEATHS PER MILLE SINCE 1900

Year.	Total number of Births.	Ratio per 1000 population per annum.	Total number of Deaths.	Ratio per 1000 population per annum.
1900	10,773	12·7	36,709	43·2
1901	9,129	10·7	32,456	38·2
1902	12,122	14·2	31,410	37·0
1903	13,182	15·5	29,765	35·1
1904	15,250	17·9	27,323	32·2
1905	15,637	18·4	32,181	37·9
1906	15,083	17·7	30,293	35·7
1907	16,224	19·1	31,942	37·6
1908	17,043	20·1	27,639	32·6
1909	19,423	22·9	28,946	34·1
1910	17,106	20·1	23,728	27·9
1911	19,515	21·7	24,396	27·2
1912	19,426	21·6	25,209	28·1
1913	18,386	20·5	26,188	29·2
1914	17,386	19·4	25,431	28·3

All ratios up to 1910 calculated on census population in 1901, and those for 1911 to 1913 on the census population in 1911.

¹ These figures, which I give from the Public Health Reports, are obviously incorrect; the low mortality of 1876, 1881, and 1891, compared with that of 1901, can only be explained by defective registration.

TABLE B

POPULATION OF THE PRINCIPAL CITIES OF INDIA, WITH
BIRTHS AND DEATHS PER MILLE

Name of City.	Population.		Births and Deaths ¹ per mille.	
	1901.	1911.	Births.	Deaths.
Calcutta	847,796	896,067	21·7	27·2
Bombay	776,006	979,445	21·85	35·05
Madras	509,346	518,660	38·83	42·0
Hyderabad (Deccan)	448,466	499,840	...	38·34
Howrah	157,594	179,389	20·05	30·54
Lucknow	264,049	260,621	...	29·29
Rangoon	234,881	293,316	18·31	38·32
Delhi	208,575	227,871	42·02	47·95
Benares	209,331	208,121	45·89	65·33
Lahore	202,964	228,318	...	32·69
Cawnpore	197,170	157,040	41·58	60·37
Agra	188,022	182,419	...	30·29
Allahabad	172,032	159,701	25·2	26·1
Jaipur	160,167	136,191	...	...
Patna	134,785	136,153	22·94	30·59
Nagpur	127,734	108,442	41·0	50·7
Karachi	116,663	159,270	44·31	35·94
Baroda	103,790	99,376	...	...
Dacca	89,733	108,188	30·83	25·36

ADMINISTRATIVE DIVISIONS

For purposes of administration the town of Calcutta was split up into four divisions by Act XXIV. of 1840, and this arrangement was continued by Act XVI. of 1847, with the proviso that the Governor of Bengal should be competent to make further subdivisions if the exigencies of administration should require it. Act X. of 1852 reduced the divisions to two, the line of demarcation being drawn from a point on the Hughli along Fairlie Place, Dalhousie Square North, Lalbazaar and Bowbazaar Streets, while power to alter this alignment was reserved to the Governor.

¹ All ratios calculated on census population in 1911.

In 1863 the statutory divisions were abolished, but quasi-separate administrations were nevertheless retained for the Northern and Southern Divisions, the dividing line being formed by Fairlie Place, Dalhousie Square North, Lalbazaar Street, Lower Chitpore Road, and Machuabazaar Street. For purposes of conservancy and drainage these two divisions were from time to time subdivided into convenient units, which at no time exceeded nine in number. Thus between 1881 and 1887 there were nine subdivisions or units (including Hastings), but in 1887-88 the transfer of conservancy to the Health Department had the effect of reducing them to six, to conform to the organisation of that department. Under Act IV. of 1876 and Act II. of 1888, the local unit—the Ward—again obtained statutory recognition; the division of Calcutta into 25 wards by the latter Act was for electoral purposes, but the unit thus created has naturally been largely utilised for administrative purposes. The 'Northern' and 'Southern' divisions, though the nomenclature persisted, were no longer officially recognised, and the division into Wards was renewed by Act III. of 1899.

In 1901-2 the adoption of the decentralised 'District System' introduced a new administrative unit, and the change has had far-reaching results.

District III. comprises 7 Wards, while each of the three other districts contains 6 Wards. The Wards are subdivided for conservancy purposes into blocks, which constitute the smallest administrative unit. The Districts are as follows:—District I., 1854 acres, with a population of 300,486; District II., 1425 acres, with a population of 212,215; District III., 2793 acres, with a population of 163,305; and District IV., 5882 acres, with a population of 185,495.

THE FRANCHISE

We have seen that the attempt to introduce the elective principle by Act XXIV. of 1840 failed; it was clear that the people were not yet ripe for any thorough-going representative system.

Act XVI. of 1847 provided for the election of four out of the seven Improvement Commissioners, but the system worked badly, and the privilege was withdrawn by Act XXVIII. of 1854.

The régime of the Improvement Commissioners—four in number between 1854 and 1856, three in number from 1856 to 1863—who were appointed by Government, was succeeded by the quasi-representative government of the Justices, who however were all nominated by Government.

The elective principle was introduced somewhat dramatically in 1876; the new Municipal Bill, which had already been drafted (so far as the constitution was concerned) on the lines of Act VI. of 1863, was at the last moment recast and rearranged to embrace the principle of self-government. For the purposes of election the town was divided into 18 Wards, which were to elect 48 Commissioners, the remaining 24 being nominated by Government. The first election took place on the 1st September 1876, the widest publicity being given to the provisions of the law as well as to the qualifications of voters and intending candidates.

In 1879 the election rules, framed under section 17 of the Act, were revised, with the object in particular of preventing the trafficking in blank voting-papers signed by voters.

The preparation of a list of voters, however, remained a matter of peculiar difficulty; the assessment registers were notoriously inaccurate, and it devolved on the Chairman to decide whether persons claiming to vote had paid the minimum amount of rates and taxes which qualified them as voters. Act II. of 1888 contained provisions for the preparation of an election roll, and prescribed the following qualifications for voters :—

- (1) Ownership or occupation of a house valued at not less than Rs300 per annum; or
- (2) Ownership *and* occupation of a house valued at Rs150 to Rs299 per annum; or

- (3) Payment of license fees of Rs25 or upwards per annum ; or
- (4) Payment of not less than Rs24 as rates and taxes in the aggregate.

Act III. of 1899.—Under this Act the number of Commissioners was reduced to fifty, of whom half were elective. They are elected for a term of three years, and the legal qualification of a candidate is that he shall be enrolled in the municipal election roll as a voter of some ward. The provisional election roll must be prepared by the Chairman (or in practice by the Deputy Chairman) on or before the 1st day of December immediately preceding each general election, in accordance with the rules laid down in Schedule IV. of the Act.

The qualification for a voter is that he shall be enrolled in the election roll for the ward in which he proposes to vote, and only a person of the male sex, who has attained the age of twenty-one years, and resides or pays municipal rates or taxes under the Act in Calcutta, and who fulfils one of the following conditions, is entitled to appear on the election roll :

- (1) If he is registered in the assessment book
 - (a) As the owner and occupier of some land or building in Calcutta valued for assessment purposes at not less than Rs150 per annum ; or
 - (b) As the owner or occupier of some land or building in Calcutta so valued at not less than Rs300 per annum ; or
- (2) If he has taken out a license under the Act costing not less than Rs25 for the year in which the election is held ; or
- (3) Has paid for the year immediately preceding the year of election not less than Rs24 in respect of rates or taxes or both under the Act. A person may be qualified to vote in more than one ward, and he may have additional votes, provided that no person may give more than eleven votes in any one ward.

Definite provisions were incorporated in the substantive law to regulate the procedure in municipal elections, while matters of detail were relegated to Schedules IV. and V.

It was found that the obligation to register their names in the Assessor's office some months before the date of an election had the effect of disqualifying those rate-payers who took little interest in municipal affairs, and in 1908 Schedule IV. was amended so as to place the obligation on the Chairman, and the number of voters and of votes cast in 1909 showed a considerable increase over the figures at the previous election. There were contests however in only eight wards, and only 11 per cent. of the qualified electors actually voted. In 1912 there were 35,852 voters with 87,135 votes; in 1915 there were eleven contests, and 38,412 voters gave 95,492 votes. The votes cast in the contested wards were 57 per cent. of the voting power in such wards, as compared with 42 per cent. in 1912 and 45 per cent. in 1909. For the first time, following a ruling of the High Court, the names of owners of *huts* having an annual valuation of Rs300 and above were included (in 1915) in the election roll.

The Ward Commissioners of 1915 consist of 20 Hindus, 3 Jews, and 2 Europeans, and classified according to professions there are 10 landholders, 9 lawyers, 3 doctors, and 3 merchants. The following statement shows the votes cast since the elective principle was adopted, and classifies the personnel of the Corporation according to religion or nationality :—

TRIENNIAL ELECTIONS

Year of Election.	Number of Contests.	Number of Voters.	Number of Votes.	Classification of Commissions.			
				Hindus.	Muhammadans.	Europeans and Anglo-Indians.	Jews and Parsees.
1876	...	4,994	...	40	7	20	2
1879	...	7,004	12,101	45	6	17	3
1882	...	10,587	24,338	40	8	22	4
1885	11	9,548	23,328	33	11	25	3
1888	19	11,664	46,402	38	11	23	3
1891-92	16	12,584	51,918	...	...	...	...
1894-95	14	13,432	57,036	39	13	20	3
1898	13	13,890	58,476	40	11	21	3
1900	3	13,432	40,205	16	7	24	3
1903	2	6,519	13,752	...	...	...	...
1906	10	9,958	20,572	16 ¹	2	4	3
1909	8	28,202	70,201	...	...	...	...
1912	...	35,852	87,135	19 ¹	1	1	4
1915	11	38,412	95,492	25	4	17	4

EDUCATION

The Calcutta Municipality has not, like the English local authorities, assumed any large share in the responsibility for popular elementary education. In 1874 the appeal of the Inspector of Schools, Presidency Division, for a grant in aid of the primary schools of Calcutta was rejected on the ground that the Commissioners were not authorised to expend municipal funds on such an object, and it was not until 1888 that statutory provision for such expenditure was made, and then only in a permissive form. In fact, such provision was made merely because an annual grant of Rs3000 on education was already being incurred in the suburbs, and it was felt that it would be invidious to make the withdrawal of this grant an effect of the amalgamation of town and suburbs.

¹ These figures represent only the elected or Ward Commissioners; the complete figures for this statement were not available at the time of going to press; there are other gaps due to the same cause.

Between 1889 and 1895 the annual grants averaged under Rs3000, in spite of Government resolutions drawing attention to the moral obligation of the Commissioners to provide for the primary education of Calcutta. In 1901-2 the grant was raised to Rs10,000; in 1908 a Committee considered but rejected a proposal that the Corporation should assume responsibility for primary and technical education in Calcutta, with the aid of a Government grant equivalent to the present expenditure of the State under these heads. In 1914-15 the aggregate amount of aid given to educational institutions by the Corporation was Rs76,824, divided amongst 440 schools (mostly primary, some technical, and some conducted—like the Deaf and Dumb School—as charitable institutions). The average daily attendance at the aided schools was 25,354.

The Corporation has also done little for the encouragement of libraries. The Calcutta Public Library was originally a private enterprise, but was converted into a public library, and housed in 1844 in Metcalfe Hall, which was built in that year to perpetuate the memory of Lord Metcalfe, Officiating Governor-General of India. Between 1890 and 1895 the Corporation, after long negotiations with Government, and on the invitation of Sir Alexander Mackenzie, assumed responsibility for the support and management of the Library, which had fallen into financial difficulties. It was however found that an enabling Act was necessary to regularise the transfer of the property to the Corporation, and while the matter was still unsettled the Government of Lord Curzon proposed to take over the library on certain conditions, and to equip it on a scale to suit the tastes and requirements of the educated public of Calcutta. In 1901 the shares of the original proprietors were bought up, the building renovated, and the library augmented.

It is now known as the Imperial Library, and the Corporation has no voice in its management. In 1914-15 the Corporation made grants amounting to Rs5875 to twenty-nine libraries.

CHAPTER XIII

FINANCE AND ACCOUNTS

Early Municipal Finance.—It is proposed in this chapter, firstly, to sketch in broad outline the expansion over roughly a century of the municipal revenues and expenditure; and secondly, to trace the evolution or elaboration of municipal finance, with special reference to the statutory provisions by which it has been developed and governed.

The earliest taxation for municipal purposes in Calcutta was the assessment on houses and lands imposed by an Act of the first year of the reign of George I., but the creation of a proper municipal fund dates from 1793, when regular assessments on houses and lands were authorised by section 158 of 33 Geo. III. c. 52, under which the Justices of the Peace for the town of Calcutta might make 'an equal assessment or assessments on the owners or occupiers of houses, buildings, and grounds . . . according to the true and real annual values thereof, so that the whole of such assessment or assessments shall not exceed in any one year the proportion of $\frac{1}{25}$ th part of the gross annual values thereof respectively, unless any higher rate of assessment shall, in the judgment of the Governor-General in Council, or Governor in Council, become essentially necessary . . .,' in which case a further rate of $2\frac{1}{2}$ per cent. might be imposed. Section 159 of the statute empowered the Justices to grant licenses for the sale of spirits within the town, and authorised the Governor-General to prescribe the limits of the town for this purpose.

During the régime of the Justices (1793-1840) municipal expenditure was classified under the following heads :—

- (1) Watching, cleansing, and repairing the streets.
- (2) Police and judicial work.

(3) Watering, lighting, and improvement of roads and drains.

(4) Salaries of Magistrates.

The charges under head (1), amounting in 1836 to Sa.Rs2,83,866, were partly met by the house-tax (Sa. Rs1,97,200), the balance being provided by Government, which in that year derived an income of Sa.Rs1,46,100 from the *abkari* tax. The charges under head (2) amounted in 1836 to Sa.Rs2,46,128, and included the following items :

(a) Office establishment and contingent expenses of the Justices.

(b) Law and miscellaneous police charges.

(c) Fire engine establishment.

(d) Repair of the Esplanade roads, which remained in charge of Government.

(e) Maintenance of public tanks.

(f) Diet charges for prisoners and hospital patients.

The charges under head (3) amounted roughly to about $\frac{1}{2}$ lakh, and those under head (4) to a lakh.

The total expenditure was thus about 6 $\frac{3}{4}$ lakhs per annum. We have seen that between 1809 and 1836 many important original works of improvement, such as new roads, tanks, and squares, were executed with the Lottery Funds, but in deference to the agitation at home against the morality and expediency of the lottery system, public lotteries were abolished in 1837.

Pre-Loan Period (1840-1863).—The raising of loans for municipal purposes was comparatively rare in the United Kingdom before the last century, the cost of such original works as could be undertaken being defrayed out of the revenue raised by assessment or otherwise. In Calcutta the lottery system had provided capital for works which could not be financed from revenue, and its abolition curiously enough coincided with the recognition of the urgent need for costly municipal improvements, such as a proper drainage scheme and a pure and diffused water supply. Between 1840 and 1863 the Municipality **marked time**; the different Boards of Improvement

Commissioners, whose régime began in 1847, did good work with the limited resources at their disposal, and they deserved well of Calcutta in putting in hand the drainage scheme in 1859. But the needs of Calcutta had outgrown the limits which its revenue system prescribed, and its reserves of wealth could not be easily tapped without basing its administration on the broad principle of representative government.

In 1847 the house-tax still yielded less than 2½ lakhs of rupees, while the new tax on horses and vehicles brought in only Rs60,000 a year. In 1856 the house-tax amounted to Rs3,58,716, and fees and fines realised Rs11,000; the carriage and horse tax, however, had been abolished. Act XXVIII. of that year provided for a lighting-rate at 2 per cent. and a drainage-rate at 2½ per cent., in such portions of the suburbs as might be included within the system of sewerage and drainage; it was also provided that out of the house-rate, which had been raised to 7½ per cent., one lakh and a half should be set aside each year towards the cost of the drainage scheme, along with Rs30,000 for a water supply. By 1863, when the tax on trades and professions was introduced, the total yield from all sources was under 8 lakhs, of which about Rs1,60,000 was absorbed in conservancy, Rs2,70,000 in watering, repairing, and lighting the roads, Rs38,000 for water supply, and Rs2,04,000 for drainage.

Development after 1863.—Between 1863 and 1876 a large amount of capital was sunk in original works of improvement, such as the Municipal Refuse Railway (6½ lakhs), the Market (6½ lakhs), public latrines and night-soil depots (3½ lakhs), slaughter-houses (2½ lakhs), while vastly greater sums were expended in opening out new streets or extending existing streets, and in carrying out the great drainage and water-supply schemes.

During these fourteen strenuous years nearly two crores of rupees were spent by the Justices for the improvement of the town. The capital could only be obtained by borrowing, and from 1863 onwards the regulation by statute of municipal finance became more and more detailed; the powers of the municipal authorities in

respect of expenditure, the constitution of separate funds for specific purposes, the objects to which municipal funds must or (in some cases) may be applied, the mode of raising loans and repaying them, the financial control of Government—such matters as these now began to be definitely governed by legislative provisions. Act IX. of 1867 limited the borrowing capacity of the Justices to 55 lakhs of rupees, exclusive of loans from Government on account of the water supply; Act VIII. of 1870 gave them power to borrow 6 lakhs for the erection of markets, and Act VIII. of the following year authorised them to borrow an additional 6 lakhs for the same purpose, while Act II. of 1874 authorised a further market loan of 7 lakhs. By Act I. of 1872 their general borrowing capacity was increased by 30 lakhs.

Period from 1876 to 1888.—The Act of 1876 contained important provisions for the payment of interest on the municipal debt and for the formation of a reserve fund; between this year and 1888 the Municipality borrowed 86½ lakhs on account of drainage, water supply, and miscellaneous works. During this period some 13 lakhs were spent on bustee improvements, several new but unfortunately narrow lanes were opened out, the mehtar system was municipalised, tank-filling was pushed on, the lighting of the town was extended and improved, bathing platforms were constructed, the original drainage scheme completed, and the supply of water doubled. The revenue increased from over 25 lakhs in 1875 (exclusive of the police-rate) to 32 lakhs in 1888, while the loan liabilities, which at the end of 1875 amounted to 1 crore and 50 lakhs of rupees, with annual interest and sinking fund charges of Rs10,25,000, had risen in 1888 to Rs1,75,61,159,¹ with annual charges of Rs11,70,927.

¹ Government Loan	Rs62,13,959
Debentures	1,13,47,200
	<u>1,75,61,159</u>

Annual Loan Charges :

Interest on Debentures	Rs5,70,141
Sinking Fund	4,36,472
Repayment of Government Loan	4,64,314
	<u>11,70,927</u>

Period from 1889-1899.—The amalgamation of the suburbs with the town was responsible for a large increase in expenditure. The Commissioners were by statute bound to spend at least 3 lakhs per annum on the improvement of the suburbs, while the extension of the drainage and water supply schemes to these new areas served to swell the capital account of the Corporation.

During this decade there was a pause in the improvement of the town, the capital of the Corporation—apart from the large outlay on Harrison Road (Rs27,37,000)—being largely diverted to meet the pressing needs of the added area. By 1899 the municipal debt had grown to Rs3,05,34,701,¹ on which the annual charges for interest and sinking fund amounted to Rs20,03,923.²

Period 1900-1915.—The last of the well-defined periods into which the development of modern Calcutta can be conveniently divided is distinguished by many notable works.

Important municipal institutions—gowkhanas, markets, dhobikhanas, burial-grounds, the central and district offices—were constructed or extended, new squares were laid out, and some fine thoroughfares opened up; the Suburban and Fringe Area drainage schemes have been completed, the surface drainage of the southern added area is in progress, and the water supply has been enormously augmented by the new mains and the great elevated reservoir. These works have all been described in detail elsewhere, and an account has also been given of the introduction of the district system, the reorganisation of the Collection, License, Assessment, and Collection Departments, the improvement of the conservancy arrangements, and the creation of new departments (Building, Lighting, Stores, and Law), which have all swelled the revenue charges.

The loan liabilities of the Corporation at the end of the year 1913-14 amounted to Rs4,92,27,500, secured by the

¹ Of which loans from Government amounted to Rs34,42,901.

² Viz., Interest on Debentures Rs12,17,691
Sinking Fund 3,21,918
Repayment of Government Loan 4,64,314

Rs20,03,923 •

rates and taxes of the town, and by assets, provided but no longer weighted by loans now extinguished, and by other assets (lighting accessories, the live and dead stock of the gowkhanas, the permanent way and rolling stock of the Refuse Railway, tools and plant, furniture and fittings, etc.), which have been paid for from revenue. The undischarged balance of ordinary debenture loans are classified as follows, according to the rate of interest :—

5 per cent. debenture loans . . .	Rs1,14,01,900
4½ per cent. debenture loans . . .	50,00,000
4 per cent. debenture loans . . .	3,28,25,600
Total . . .	<u>Rs4,92,27,500</u>

on which the interest charges amount to Rs21,08,119 and Sinking Fund A charges to Rs4,92,275.¹ The total amount of debenture loans paid off by the Corporation since the first loan was raised in 1864 is Rs1,44,72,900.

The borrowing capacity of the Corporation, as limited by section 130 of the Loans Act of 1914, to which further reference will shortly be made, admitted at the end of 1914 of a further 4 per cent. loan of about Rs1,67,00,000 repayable in thirty years, or of about Rs2,30,00,000 repayable in sixty years. The total revenue receipts of the Corporation in 1913-14 amounted to Rs1,04,49,275, divided as follows :—

(1) Consolidated rate	Rs73,44,191,
(2) Taxes and fees	11,29,012
(3) Other receipts	19,76,072

The revenue payments were as follows :—

(1) Establishment (including pension, provident fund contribution, leave allowances, Commissioners' fees) . . .	Rs24,88,079
(2) Loan charges	29,11,034
(3) Works and other charges	49,32,185
Total	<u>Rs1,03,31,298</u>

¹ Under section 130 of the new Loans Act of 1914, these annual charges will amount to Rs29,86,326.

The surplus of *income over expenditure* however (if we cease to base our figures upon the actual receipts and payments of the year) was Rs1,59,582, which together with the opening balance of Rs18,69,160 gave a net balance at the close of year, after deducting all outstanding liabilities, of Rs20,28,742. The financial position of the Corporation is therefore particularly strong, and the more gratifying when it is remembered that recently the Municipality has had to meet the annual contribution of 2 per cent. on the rateable value of the city to the Calcutta Improvement Trust, amounting in 1913-14 to over 8 lakhs.

Analysis of Income and Expenditure.—We have seen that the consolidated rate yields nearly $73\frac{1}{2}$ lakhs, and taxes and fees about $11\frac{1}{4}$ lakhs. The rents of land and other properties bring in about Rs $3\frac{3}{4}$ lakh, while the profits on the sale of surplus lands in 1913-14 gave about Rs $2\frac{3}{4}$ lakhs. Miscellaneous fees (drainage, scaffolding, etc.) contribute nearly a lakh, markets over 4 lakhs, slaughter-houses and dhobikhanas nearly a lakh, rents due from the Tramways and Telephone Companies and the Electric Supply Corporation Rs65,000, fines about a lakh, grants, contributions, and the interest on surplus cash balance over $2\frac{3}{4}$ lakhs, profit on workshops, sale proceeds of unserviceable stores, burial-ground fees, etc., nearly $1\frac{1}{2}$ lakhs, and finally the sale of water and miscellaneous fees over $4\frac{1}{2}$ lakhs.

- Of the total expenditure, nearly Rs24 lakhs are spent on establishment and nearly 30 lakhs on loan charges.

Table I. below shows the revenue receipts of the Corporation since 1864 :—

TABLE I
RECEIPTS (REVENUE FUNDS)

Year.	Rates.	Taxes.	Total Revenue under all heads.
1864 . . .	Rs9,88,477	Rs3,16,843	Rs14,33,644
1865 . . .	10,14,835	3,48,372	15,82,991
1866 . . .	10,96,493	3,25,817	16,19,779
1867 . . .	13,34,487	3,71,858	18,45,906
1868 . . .	11,43,133	3,14,249	17,69,176
1869 . . .	11,48,070	3,94,985	17,08,527
1870 . . .	17,64,404	3,87,781	23,12,061
1871 . . .	17,36,392	3,84,992	23,37,925
1872 . . .	16,48,840	3,85,548	22,70,967
1873 . . .	15,76,286	3,93,376	22,19,198
1874 . . .	16,43,715	3,97,345	23,47,468
1875 . . .	17,10,337	3,99,805	25,54,834 ¹
1876 . . .	17,71,959	4,03,767	25,43,215
1877 . . .	17,12,640	4,07,798	25,70,145
1878 . . .	16,69,884	3,97,340	25,86,627
1879 . . .	23,10,396	3,83,348	31,31,376
1880 . . .	20,22,844	3,74,685	28,15,378
1881 . . .	18,36,636	3,96,034	26,50,349
1882-83 . . .	18,19,524	3,92,293	26,80,884
1883-84 . . .	18,27,567	4,01,865	27,10,640
1884-85 . . .	18,65,638	3,96,093	27,23,971
1885-86 . . .	19,20,725	3,79,169	27,77,862
1886-87 . . .	21,69,307	3,56,233	30,01,634
1887-88 . . .	22,24,109	3,77,638	31,18,624
1888-89 . . .	23,88,612	3,87,687	32,73,274
1889-90 . . .	31,78,644	4,98,194	41,13,274
1890-91 . . .	30,95,421	5,24,229	40,92,844
1891-92 . . .	32,14,573	5,33,390	42,25,053
1892-93 . . .	33,11,990	5,46,343	43,13,569
1893-94 . . .	33,97,791	5,50,292	44,74,373
1894-95 . . .	34,75,779	5,48,827	45,12,476
1895-96 . . .	35,82,709	5,52,151	46,70,781
1896-97 . . .	36,79,436	5,59,221	47,98,296
1897-98 . . .	36,51,807	5,32,135	47,51,059
1898-99 . . .	37,75,732	5,22,452	48,26,848
1899-1900 . . .	39,38,179	5,84,508	51,97,079
1900-1 . . .	41,21,508	6,10,493	54,30,753
1901-2 . . .	45,63,197	6,33,671	59,02,738
1902-3 . . .	45,22,094	5,69,044	58,64,497
1903-4 . . .	46,05,978	6,91,773	61,64,732
1904-5 . . .	47,97,847	7,34,333	66,48,727
1905-6 . . .	50,92,690	7,51,612	67,85,555
1906-7 . . .	52,50,458	7,84,555	71,07,874
1907-8 . . .	54,94,575	8,06,777	74,27,667
1908-9 . . .	56,89,977	8,38,739	79,03,997
1909-10 . . .	58,92,310	8,78,082	80,68,399
1910-11 . . .	62,22,801	9,26,083	86,60,067
1911-12 . . .	66,20,023	9,56,618	91,27,639
1913-14 . . .	73,44,191	11,29,012	104,49,275

Table II. below shows the capital receipts and expenditure since 1900 :—

TABLE II

CAPITAL

Year.	Receipts.	Expenditure.
1900-1 . . .	Rs13,41,000	Rs12,20,000
1901-2 . . .	21,54,000	18,93,000
1902-3 . . .	15,52,000	20,92,000
1903-4 . . .	47,59,000	37,91,000
1904-5 . . .	33,90,000	22,95,000
1905-6 . . .	16,90,000	22,01,000
1906-7 . . .	14,79,000	20,06,000
1907-8 . . .	28,10,000	19,92,000
1908-9 . . .	22,53,000	22,94,000
1909-10 . . .	61,77,000	50,73,000
1910-11 . . .	35,15,000	33,16,000
1911-12 . . .	12,40,097	15,86,258
1912-13 . . .	35,48,283	22,62,042
1913-14 . . .	3,02,321	14,06,045

STATUTORY SOURCES OF REVENUE

The genesis and development of the house-rate has already been described, and reference has been made to the tax on carriages, carts, and horses first introduced in 1847, then abolished in 1852 and reimposed in 1856. Act XVI. of 1847 also supplemented the revenues by authorising license fees for scaffolding, sunshades, public latrines, illuminations, etc. In 1856 the Commissioners were empowered to levy a drainage-rate not exceeding $2\frac{1}{2}$ per cent. on the annual value of all lands and houses, and a lighting-rate of 2 per cent. The tax on trades and professions was introduced in 1863, and the same Act authorised a water-rate on a sliding scale, varying from 2 to 5 per cent. on buildings, and a fixed annual rate of 12 annas 10 pice for every kotha of land occupied by

huts.¹ Fees for the registration of cattle-sheds were levied in 1877, and for offensive trades and meat-shops in 1889, while the former were supplemented by the scavenging tax, first imposed in 1901-2. The police-rate, imposed under Act XI. of 1867, was limited to 3 per cent. of the annual value of lands and houses, and was payable by the occupiers; this taxation was extremely unpopular, and it was abolished in 1888.

Rates.—The rates now raised for general municipal purposes are four in number, but they have since 1888 been levied as one consolidated rate.

(1) The *House-Rate*, known since 1888 as the *general rate*, was, as we have seen, originally levied at 5 per cent. on the annual value of buildings and lands. In 1847 the proceeds were applied to lighting and watering the streets, the provision of a water supply, general conservancy, and other works of general improvement, as well as to the original purpose of the fund, viz., the watching, cleansing, and repairing of roads. Act X. of 1852 raised the percentage to $6\frac{1}{4}$, and added the construction of drains and sewers to the objects for which the fund might be utilised. In 1856 the rate was raised to $7\frac{1}{2}$ per cent., and sections 25 and 29 of Act XXVIII. directed that Rs1,50,000 and Rs30,000 should be set aside annually for drainage and water supply respectively. Act VI. of 1863 raised the maximum of the rate to 10 per cent. on the annual value of buildings, and Rs4 per kotha on lands which were vacant or occupied by huts. In 1863 the rate was fixed by the Justices at 10 per cent., in 1868 at 8 per cent., in 1870 at 9, in 1873 at 8, in 1876 at $7\frac{1}{2}$, and in 1877 at 7 per cent. The present statutory maximum of 13 per cent. was first authorised by Act II. of 1888, and the enormous appreciation of land values in Calcutta within recent years has rendered it unnecessary to increase the percentage. The rateable valuation of the city, which in 1888 was $1\frac{3}{4}$ crores, had on the 1st April 1915 risen to Rs4,21,01,080.

(2) The *Drainage or Sewage Rate*, first imposed by section 26 of Act XXVIII. of 1856, was limited to $2\frac{1}{2}$ per

¹ This rate was not actually imposed until 1870.

cent., and confined to landed property situated within the area covered by the drainage scheme. In 1888 the maximum percentage was changed to 2 per cent., at which it still stands, and the rate is now levied at this maximum.

(3) *The Water-Rate*, authorised in 1863, could not be levied until the water supply scheme was completed; the maximum rate was fixed at 4 per cent. on the annual value of property in any area in which the supply had been introduced. Act IX. of 1867 limited the assessment to premises not more than 150 yards from a standpipe, and Act I. of 1870 authorised the immediate levy of the rate up to 5 per cent. In 1876 the maximum rate was increased to 6 per cent. in the case of premises situated in streets supplied with standposts, 5 per cent. being authorised for all other premises. Under Act II. of 1888 and the existing Act, this distinction is maintained, with the modification that premises more than 150 yards from a public standpost must be assessed at 3 per cent. less than premises otherwise situated.

(4) *The Lighting-Rate* has remained at 2 per cent. since it was first imposed by Act XXVIII. of 1856, the only change being the abolition in 1863 of the exemption enjoyed by premises valued at less than Rs10 per mensem.

Present Percentage.—The consolidated rate (payable on or before 15th April, 15th July, 15th October, and 15th January respectively, for the quarter commencing on the first day of these months) is now levied at 19½ per cent. on the annual valuation; it comprises the following rates :—

General rate, 9½ per cent.

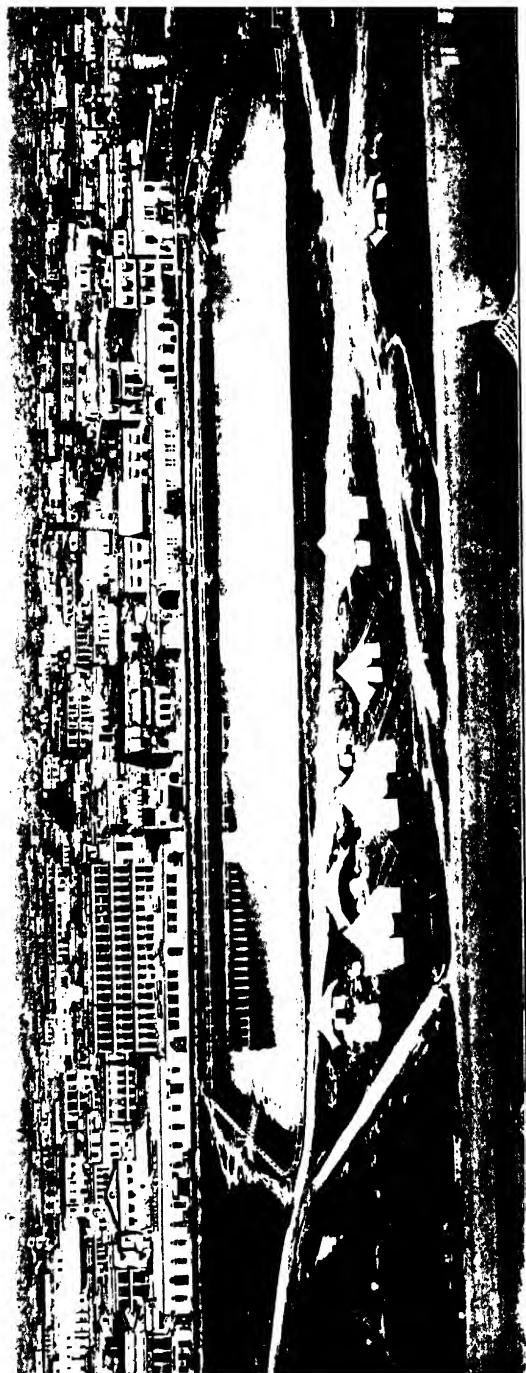
Water-rate, 6 per cent.

Lighting-rate, 2 per cent.

Sewage-rate, 2 per cent.

MUNICIPAL FUNDS

General.—Although the earlier Municipal Acts specified certain objects to which the proceeds of the different rates might be applied, the entire revenue from rates,



View of town and bay from cable car.

finer, fees, Government contributions, and miscellaneous sources had been incorporated in one common fund, known as the Municipal Fund, and it was not until 1888 that separate funds, corresponding to the four chief departments, viz., General, Water Supply, Drainage, and Lighting, were created. The maintenance of separate accounts for borrowed money, though not prescribed, has also been customary since 1888, under the four heads adopted for revenue funds.

Subordinate funds, which have no statutory recognition, have from time to time been opened in connection with special improvement works, *e.g.*, the Harrison Road Fund, the Municipal Market Fund, the Plague Fund, etc., and there are also certain other funds—the Jute Warehouse Fund, the Hackney Carriage and Cart Registration Funds, the Suburban Improvement Fund, and the Sinking Fund—which are prescribed by special Acts or particular clauses of the Municipal Act. We are concerned here with only the last two funds—the Suburban Improvement Fund and the Sinking Fund.

Suburban Improvement Fund.—Act II. of 1888 required the Commissioners to devote not less than 3 lakhs annually to the improvement of the added areas, 'provided that the instalments of interest and reserve fund payable on any capital sum expended' on the drainage and improvement of bustees, on the maintenance of a water supply, and on conservancy and general improvements, should be taken as a part of the said 3 lakhs.

Act II. of 1899 practically repeated this injunction and its proviso, with the further proviso that if in any year more than 3 lakhs were spent on the improvement of the added area, the excess might be deducted from the amount to be spent in the next following year. The interpretation of section 37 of Act II. of 1888 was much debated between 1891 and 1895, and the joint opinion of three leading counsel taken in 1892 was included in a fresh case laid before three equally eminent counsel in 1895. The provision was more clearly expressed in the Act of 1899, and the statutory obligation is now more than discharged by the payment of

interest and of the Sinking Fund contribution on the capital sunk in such works as the extension of the filtered and unfiltered water supply, the drainage of the suburbs, and the construction of squares, roads, etc.

Sinking Fund.—In 1862, after reserving the sum of Rs44,000 to meet the interest charges on their debenture loan, the Commissioners decided to utilise the balance of the annual sum (Rs1,50,000) which they were bound to set apart for the drainage scheme as a Sinking Fund for the liquidation of the debt.

In 1867 the Justices determined to set aside annually a sum equal to 2 per cent. on the borrowed capital, and to open therewith a Reserve Fund at the Bank of Bengal, under the management of the following trustees, viz., the Chairman, the Accountant-General, Bengal, the Secretary and Treasurer of the Bank of Bengal, and Babu Hiralal Seal, the well-known zemindar. The trustees were empowered to invest the funds in Government securities or to expend them in liquidating existing debentures. The Water Supply loan of 52 lakhs of rupees was granted by the Government of India that year, on condition that 2 per cent. of the amount should be paid annually into the Sinking Fund.

It was not however until 1872, by Act I. of that year, that the institution of a Reserve or Sinking Fund became a statutory obligation, with the Revenue Secretary to the Government of Bengal and the Accountant-General as trustees; the old Reserve funds were transferred to the new trustees, and the Justices were authorised to invest the funds in the name of the trustees either in securities guaranteed by Government or in municipal debentures.

Act II. of 1888 introduced two changes, which were continued in the Act of 1899, viz., the annual payments to the Sinking Fund were reduced to 1 per cent. in the case of all loans contracted after the 1st of April 1881, while the Financial Secretary to Government was appointed in place of the Revenue Secretary as one of the trustees of the fund.

Separate accounts were also prescribed for the 2 per cent. and the 1 per cent. sinking funds. •

In 1910 a serious defect in the practical working of section 133 of the present Act was brought to the notice of the Corporation. Briefly the difficulty was this, that while the 1 per cent. contribution matures by regular investment of its accumulation into the full amount of the loan in forty-seven years, the actual currency of the loans repayable out of the Sinking Fund did not exceed thirty years. The result was that the amount accumulating in the Sinking Fund, on the currency of the debentures expiring, fell short of the sum required to repay the loan, and on the 31st March 1910 this deficit amounted to Rs6,39,800. To meet the shortage, the Corporation, after some correspondence with Government, agreed to make an equated half-yearly payment of Rs28,354 for a period of ten years from 1911-12. To avoid similar deficits arising in future from appropriations made for the purpose of repaying loans expiring after the 31st March 1910, the Corporation resolved to continue the 1 per cent. contribution to the Sinking Fund for the full period of forty-seven years, *and also* to pay interest on the amount borrowed from the unmatured fund to repay the debenture holders.

The first payment made by the Corporation in 1911-12 under this arrangement was credited to a special fund, termed 'The Reserve Fund for the improvement of the Sinking Fund,' an account of which was kept in the Bank of Bengal, until the law on the subject could be amended so as to authorise its incorporation in the Sinking Fund.

In 1913-14 this special fund opened with a balance of Rs5,41,482, and in that year a further sum of Rs3,10,640 was contributed to it from revenue; including the accrued interest, the fund closed in 1913-14 with a balance of Rs8,72,851. In 1914 a short Loans Act was passed, which repealed chapter x. of Act III. of 1899; the new Act has provided for the gradual recoupment of the deficit already accrued to the Sinking Fund, and it is now proposed to close the temporary Reserve Fund and to start a new reserve fund with the aggregate amount of the contributions provided for in this Act,

from which payments to the Sinking Fund will be made on due dates.

The following are some of the more important provisions of the Loans Act, viz., the adjustment of the period of loan to the varying nature, condition, and duration of the work, subject to a maximum length of sixty years, the creation of separate Sinking Funds for all future loans, the recoupment of shortage already accrued, and the prevention of future deficits, the abolition of the Trustees and the transfer of their functions to the Corporation, the raising of loans and payment of interest thereon out of India, and the making up of shortage on any existing loan falling due for repayment, by borrowing in the market instead of by appropriations from the Sinking Funds.

Borrowing Capacity.—The first statutory check on the borrowing powers of the Corporation was provided by section 9 of Act IX. of 1867, which limited the aggregate of existing unpaid and new loans to 55 lakhs of rupees. Act I. of 1872 raised the limit to 85 lakhs, exclusive of the market loans authorised by special Acts. The Act of 1876 made the sanction of the Local Government the only restriction on borrowing 'any sums of money,' but in 1888 it was considered advisable to impose again a definite limit, and it was enacted that the annual loan charges of the Corporation (the sum payable annually for interest and maintenance of the Sinking Fund) should not exceed 10 per cent. on the annual valuation¹ of the town. The rateable valuation on the 1st April 1913 was Rs3,84,85,672, 10 per cent. of which is Rs38,48,567; the annual loan charges already amounted to Rs26,00,394, and the amount still available for loan charges was sufficient for a further loan of Rs2,49,63,000, bearing interest at 4 per cent., with a Sinking Fund contribution at 1 per cent.

Section 130 of the new Loans Act provides that the ordinary loan charges *plus* the payments required for recoupment of the accrued shortage, and for the preven-

¹ In 1909-10 the Advocate-General advised that 'valuation' meant *effective or rateable valuation*, i.e. on which rates were actually due. • •

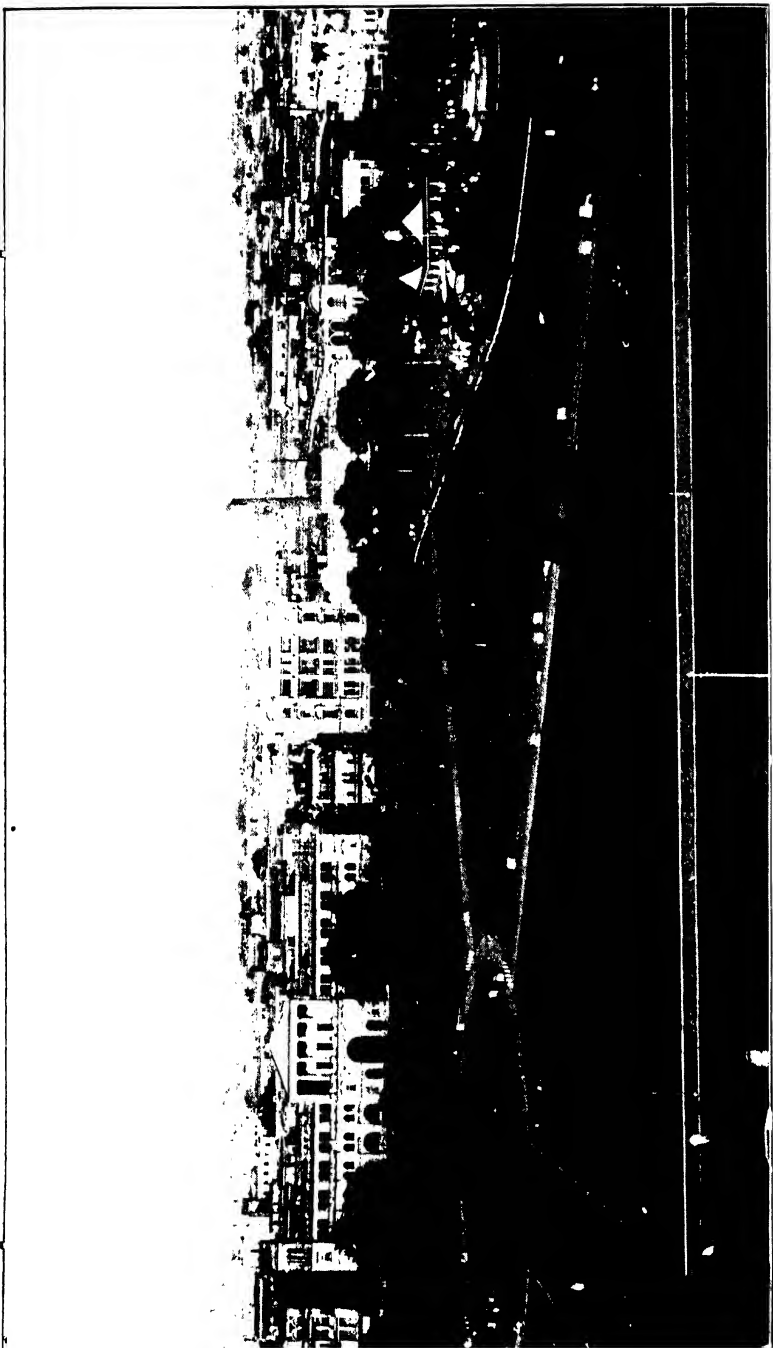


Photo by Bourne & Shepherd, Chicago

tion of further deficit in the old Sinking Fund, shall not exceed 10 per cent. of the annual valuation. The rateable valuation on the 1st April 1914 was Rs4,03,48,115, and it is calculated the amount available for further loan charges would under the provisions of the Loans Act finance a 4 per cent. loan, varying in amount from Rs1,67,00,000 repayable in thirty years, to about Rs2,30,00,000 repayable in sixty years. Including the additional 2 per cent. authorised under the Calcutta Improvement Trust, the margin of taxation now stands at $5\frac{1}{2}$ per cent., and there can therefore be no doubt that the revenue required for the service of such a loan would be forthcoming if the need arose.

Municipal Credit.—After many vicissitudes the credit of the Municipality now stands high, as the rate of interest at which its loans have been floated in recent years clearly proves. After obtaining its new constitution in 1863, the Municipality was left to borrow in the open market at the best terms which its credit commanded. Its first public loan, raised in 1864, was obtained at 6 per cent. interest, at a time when the stringency of the money market was demonstrated by the high interest which even the Government of India was obliged to pay.

Its credit however was soon exhausted, and Government came to the rescue by lending money at 4 per cent. for the drainage and water-supply schemes, and the market and office buildings. In 1877 Government was unwilling to make a further loan, but in the following year the Commissioners succeeded in raising their first 5 per cent. loan. In 1882-83 the market rate of interest fell to $4\frac{1}{2}$ per cent., and $9\frac{1}{2}$ lakhs (out of 11 lakhs required) were borrowed at a premium of Rs2.3.9. During 1883-85, however, money was expensive, and the rate of interest reached the unprecedented figure of 11 per cent. No loans could be raised for carrying on the drainage and water-supply schemes,¹ and the position was difficult, when Government again came to the help of the Com-

¹ Fifteen lakhs of debentures were offered in 1884 at 5 per cent. ; tenders were received for Rs6,45,700 only, of which only Rs85,200 at and above par was accepted.

missioners by advancing 5 lakhs temporarily without interest.

In 1885-86 the Commissioners required a loan of 25 lakhs of rupees ; only Rs3,22,000 was tendered, of which only Rs2,32,000 was accepted.

In 1891-92 the first $4\frac{1}{2}$ per cent. loan was raised ; the market was easy, and no less than Rs128 lakhs were tendered for an advertised loan of 20 lakhs, at prices varying from par to 105·8 per cent.

In 1895-96 the Commissioners found no difficulty in borrowing at 4 per cent., which has ever since been the prevailing rate for municipal loans, with the exception of the 1896-97 loan raised at $3\frac{1}{2}$ per cent., and the 1898-99 loan raised at $4\frac{1}{2}$ per cent. In 1866, and subsequently from time to time, the question of enfacing municipal debentures for payment of interest in London has been discussed, but the proposal did not find favour with the Government of India. We have seen that the new Loans Act of 1914 for the first time authorises the raising of loans and the payment of interest out of India.

Establishment for Loans.—Until 1872 loan transactions were dealt with in the Municipal Office by a small staff costing Rs100 per mensem, attached to the accounts staff ; in 1899-1900 the cost of the department was Rs8600, while in 1901 it was decided to transfer this management of debentures to the Bank of Bengal, which had done similar work for Government. The duties of the Bank in this connection include the payment of interest to debenture-holders, the renewal, subdivision, and consolidation of debentures, the repayment of loans on maturity, and the issue of debentures on floatation of loans ; the Bank receives a commission of Rs3500 per annum for every crore of outstanding loan with which it deals, in addition to fees for renewal, etc., of debentures.

The following statements show (A) the total amount of debenture loans paid off by the Corporation up to the end of 1914-15, and (B) the debenture loans still outstanding :— •

FINANCE AND ACCOUNTS

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STATEMENT A

Slaking Fund from which repayable.	Date of Repayment.	Date of Loan.	Year of Loan.	Rate of Interest.	Currency.	Amount of Loan.	Amount met from Sinking Fund.	Amount paid by fresh borrowing.
2 per cent.	1-1-85 1-8-85 1-9-86 1-9-87 1-4-90 1-12-90 1-1-92 1-7-08 1-8-08 1-5-09 1-10-10	1-1-65 1-8-65 1-9-66 1-9-67 1-1-70 1-12-70 1-1-72 1-7-78 1-8-78 1-5-79 1-10-80	1864 1865 1866 1867 1870 1870 1871 1878 1878 1879 1880	6 per cent. 6 6 6 6 6 6 5 5 5 5	20 years " " " " " " 30 years " " " "	Rs 25,62,100 6,37,500 10,00,000 5,00,000 4,00,000 3,00,000 1,00,000 4,00,000 2,50,000 6,00,000 2,50,000	Rs 25,62,100 1,46,906 1,68,132 61,000 1,12,679 35,381 34,952 4,00,000 2,43,507 15,288 10,691	Rs ... 4,90,594 8,31,868 4,39,000 2,87,321 2,64,619 65,048 ... 6,493 5,84,712 2,39,309 32,08,964
1 per cent.	1-1-03 1-4-03 1-8-03 1-2-05 1-12-10 1-12-11	1-1-83 1-4-83 1-8-83 1-2-85 1-12-95 1-12-96	1882-83 1882-83 1883-84 1884-85 1895-96 1896-97	4½ per cent. 4½ 4½ 5 5 3½	20 years " " " 15 years "	Rs 6,50,500 3,00,000 97,800 15,00,000 18,00,000 20,00,000	Rs 6,50,500 3,00,000 97,800 15,00,000 18,00,000 20,00,000	Rs
Plague Loan Reserve Fund	1-5-09 1-7-10 1-12-11	1-5-99 1-7-00 1-12-01	1898-99 1900-01 1901-02	4½ per cent. 4 4	10 years " "	Rs 4,00,000 2,25,000 5,00,000	Rs 4,00,000 2,25,000 5,00,000	Rs
						11,25,000	11,25,000	...

The sum of Rs11,25,000 was borrowed for the special purpose of prevention of plague, and was repaid out of the Plague Reserve Fund; loans for Rs63,48,300 were raised after April 1881, and were paid off out of the 1 per cent. Sinking Fund (Sinking Fund A). The remaining items of loan, aggregating Rs69,99,600, which were contracted prior to April 1881, were paid off out of the sale proceeds of securities held in the 2 per cent. Sinking Fund (Sinking Fund B), supplemented by loans amounting to Rs32,08,964 raised under section 129 of the Municipal Act.

STATEMENT B

OUTSTANDING DEBENTURE LOANS OF THE CORPORATION

Date of Loan.	Amount.	Rate of Interest.	Date of Repayment.
	Rs.		
1-9-1885	25,00,000	5 per cent.	1-9-1915
1-9-1886	24,51,900	5 "	1-9-1916
1-1-1888	15,50,000	5 "	1-1-1918
1-7-1889	5,00,000	5 "	1-7-1919
1-1-1890	14,00,000	5 "	1-1-1920
1-10-1890	20,00,000	5 "	1-10-1920
1-4-1891	10,00,000	5 "	1-4-1921
1-10-1891	20,00,000	4½ "	1-10-1921
1-2-1898	15,54,700	4 "	1-2-1919
1-12-1898	30,00,000	4½ "	1-12-1917
1-11-1899	8,70,900	4 "	1-11-1924
1-7-1901	6,00,000	4 "	1-7-1931
1-3-1902	10,00,000	4 "	1-3-1932
1-8-1902	15,00,000	4 "	1-8-1932
1-6-1903	15,00,000	4 "	1-6-1933
1-10-1903	30,00,000	4 "	1-10-1933
1-12-1904	30,00,000	4 "	1-12-1934
1-1-1906	15,00,000	4 "	1-1-1936
1-9-1906	10,00,000	4 "	1-9-1936
31-12-1906	2,81,400	4 "	31-12-1936
1-7-1907	6,00,000	4 "	1-7-1937
1-9-1907	9,00,000	4 "	1-9-1937
1-11-1907	3,13,000	4 "	1-11-1937
1-12-1907	8,05,600	4 "	1-12-1937
1-12-1908	20,00,000	4 "	1-12-1938
1-11-1909	30,00,000	4 "	1-11-1939
1-12-1909	30,00,000	4 "	1-12-1939
1-10-1910	30,00,000	4 "	1-10-1940
1-11-1912	31,00,000	4 "	1-11-1942
1-3-1915	7,22,000	4 "	1-3-1945
Total	4,99,49,500		

Accounts and Audit.—In 1848 the Commissioners directed that all moneys received should be paid into the Bank of Bengal, and withdrawn only by cheques signed by three or more Commissioners, and initialed by their Clerk (Secretary), no payment however being made unless formally sanctioned at a meeting of the Commissioners. In the same year more detailed account rules were drawn up, which form the basis of the elaborate procedure of to-day. Act XXV. of 1856 provided for a statement of receipts and disbursements, and an annual audit by a person appointed by the Local Government, while the Act of 1899 authorises the General Committee to prescribe the manner and form in which all accounts should be kept. It is unnecessary to trace the history of the different fund accounts maintained since 1856, and it will serve the purposes of this section to state that there are at present four revenue funds¹ and three loan funds.² The changes in system introduced in the Accounts Department in recent years, ending with the codification of rules in the Accounts Manual, the introduction of a detailed audit of income, an efficient system of store audit, and the preparation of a monthly progress statement of receipts and expenditure, have already been described; it remains only to refer to the important innovation adopted in 1908-9, when a scheme of accounts based on income and expenditure was substituted for the practice of exhibiting in the accounts merely receipts and payments of cash during the year.

The *audit* of the municipal accounts was after 1856 carried out by auditors appointed by Government, an annual fee of Rs2000 being paid after 1863. In 1869 the duty of audit was transferred to the Comptroller-General, whose staff performed the work until 1903-4, when Messrs. Lovelock and Lewes, Chartered Accountants, were appointed to carry out the audit, at a yearly remuneration of Rs12,000.

In 1908-9 the work was again transferred to Government, who undertook to audit, free of charge, the muni-

¹ General, Water Supply, Drainage, Lighting.

² Drainage and Miscellaneous, Water Supply, Lighting.

cipal accounts and the debenture loans account kept by the Bank of Bengal, and hitherto unaudited.

Balance Sheet.—The question of preparing a correct balance sheet of the assets and capital outlay of the Corporation was long under consideration. In 1909 Mr. S. C. Roy, of the Accounts Department, was placed on special duty to prepare a valuation of Block, which was completed in 1912.

The block, after writing off Rs1,51,466 on account of extinct block and Rs3,72,24,775 for depreciation, amounted to Rs4,66,40,788.¹

In accordance with the general practice, roads and streets were omitted from the block ; they are however valued by the Assessor, on the basis of the present values of lands abutting on these roads, at Rs5,15,28,000. The balance sheet of 1914-15 will be found in the Municipal Administration Report already published for that year.

¹ At end of 1914-15 the valuation is Rs4,79,22,470.

APPENDIX I

THE reorganisation of the Calcutta Fire Brigade engaged the attention of the authorities after the scandals of the Dar-mahatta fire ; but the establishment of a strong and efficient Brigade, equipped with the most modern appliances, may be dated from 1912, when the Chief Officer, Mr. B. A. Westbrook, submitted an exhaustive report on the deficiencies of the existing system. The Brigade at this time possessed three modern motor fire-engines, purchased in 1911-12, seven steam fire-engines, of which two were comparatively modern machines, and practically no life-saving appliances. The expenditure in 1911-12 (inclusive of the new charges entailed in the partial reorganisation of the Brigade) amounted to Rs1,72,510 as against an expenditure of Rs2,35,197 in Bombay, where the area to be protected was considerably smaller ; the number of fires in that year was 137, while the corresponding number in Bombay was 124. The fire service of Calcutta has however now been placed on an efficient footing ; the following statement shows what staff and appliances are now maintained :—

STAFF.		APPLIANCES.	
Chief Officer	1	9 Motor fire-engines, of an	
Chief Engineer	1	aggregate pumping capa-	
Engineers	2	city of over 4000 gallons,	
Assistant Engineers . .	10	per minute.	
European Firemen . . .	7	85 feet mechanically operated	
European Driver	1	motor turntable ladder.	
Inspector of Warehouses	1	7 Steam fire-engines, of an	
Tindals	15	aggregate pumping capa-	
Khalasies	145	city of about 3000 gallons	
Syces	22	per minute.	
Bhisties	2	60 feet horse-drawn turntable	
Mehtars	5	ladder.	
Mechanics	2	5 Manual fire-engines.	
Clerks	2	12 Horse-drawn hose-carts	
Peon	1	and tenders.	
Total	217	13 Hose-reels and hose-carts.	

APPLIANCES.

18 Hook-ladders.	2 Motor cars.
40 Scaling-ladders.	46 Fire alarms are available
5 Smoke helmets.	for public use, and this
43,000 feet of hose.	number will shortly be
18 Horses.	considerably augmented.
1 Motor first-aid tender.	

APPENDIX II

ACTS RELATING TO MUNICIPAL ADMINISTRATION
(GENERAL)

- xxiv. of 1840 (abortive Self-Government Act).
- xvi. of 1847 (Act appointing seven Improvement Commissioners).
- ii. of 1848.
- xxxix. of 1850.
- x. of 1852 (Board of four Commissioners set up).
- xii. of 1852.
- xxviii. of 1854.
- xiv., xxv., and xxviii. of 1856.
- vi. of 1863.
- ix. of 1865.
- iv. of 1866 (Police Act).
- vi. of 1866.
- viii. of 1866 (Police Act).
- x. of 1866 (Port of Calcutta).
- i. of 1867.
- vi. of 1867 (Police Act).
- ix. of 1867 (Borrowing capacity and water-rate).
- xi. of 1867 (provided for levy of a police-rate at 3 per cent.).
- v. of 1868 (Hastings Municipal Act).
- iv. of 1869 (Port of Calcutta).
- vii. of 1869 (Police).
- v. of 1870 (Port Improvement Act).
- vi. of 1871 (Provincial Justices excluded from Corporation).
- vii. of 1871 (Port Improvement Act).

- III. of 1872 (Port Improvement Act).
- v. of 1875 (Bengal Survey Act).
- IV. of 1876.
- IV. of 1880 (Port Improvement Amendment Act).
- I. of 1881 (Port Improvement).
- VI. of 1881 (Amendment of Consolidation Act IV. of 1876).
- I. of 1882.
- II. of 1883 (Port Improvement).
- II. of 1885 (Docks for Port of Calcutta).
- II. of 1886 (Police).
- I. of 1877 (Calcutta Survey Act).
- III. of 1887 (Port Improvement).
- II. of 1888.
- III. of 1890 (Port Act).
- II. of 1894 („ „).
- II. of 1895 (Police).
- IV. of 1895 (Port).
- VI. of 1895 („ „).
- I. of 1898 (Police).
- II. of 1898 (Port).
- III. of 1899.

SPECIAL ACTS

Bridges—

- IX. of 1871 (Howrah Bridge Act).
- III. of 1880 („ „ „).
- III. of 1888 („ „ „).

Census—

- XI. of 1871.

Debt Services—

- I. of 1872 (Municipal Debt).
- III. of 1889 (Loan to Corporation of Calcutta).
- 1914 (Calcutta Loans Act).

Disposal of Night-soil and Refuse—

- VI. of 1880 (Bengal Drainage Act).
- VIII. of 1895 (Bengal Sanitary Drainage Act).

Disposal of the Dead—

- v. of 1881 (Calcutta Burial Boards Act).
- IV. of 1889 (Muhammadan Burial Board).

Survey—

- v. of 1875 (Bengal Survey Act).
- i. of 1887 (Calcutta Survey Act).

Tramways—

- i. of 1880 (Calcutta Tramways).
- iii. of 1883 (Bengal Tramways).
- ii. of 1884 (Calcutta Tramways).
- iii. of 1894 (,, ,,).

Water Supply—

- i. of 1870 (Calcutta Water-rate Act).

BYE-LAWS, RULES, AND REGULATIONS UNDER,
ACT III. OF 1899, ETC.

Birth Registration (under sec. 538 (b) 1903).

Building (Schedule XVII. of Act III. of 1899, amended in 1910-11).

Butchers, Control and supervision of (sec. 559 (40), 1905).

Cart-driving (sec. 559 (51), 1905).

Cattle-sheds and stables (sec. 559 (26-29, 55), 1910).

Commissioners appointed by Port Commissioners, etc. (sec. 8 (3), 1900).

Compounders' certificates (sec. 498, 1907).

Corpses, Carrying and removal of (sec. 559 (43), 1904).

Corpses, Speedy disposal of (sec. 559 (42), 1905).

Cremation, at burning-ghât (sec. 559 (47), 1904, 1905).

Drainage, House- (sec. 559 (9), 1910 ; also Schedule XV.).

Elections (Schedules IV. and V. as amended in 1908).

Food and Drugs (sec. 559 (37), 1903 ; sec. 559 (41), 1908).

Gutters and Pipes (sec. 559 (19), 1904).

Hoards and Fences, Protective, in building works (sec. 559 (16), 1903).

Markets and Slaughter-houses, Sanitary condition of (sec. 559 (35), 1904).

Markets,¹ Inspection and regulation of (sec. 559 (32-36, 38, 39), 1910 ; and sec. 559 (36), 1903).

Meetings, Rules of Business at (framed under secs. 85, 94, 96 (5)).

Noxious Vegetation, Removal of (sec. 559 (54), 1905).

¹ Regulations have also been framed under section 488.

Obstructions, encroachments, etc. (sec. 559 (18), 1905).

Plumbers (sec. 559 (14), 1908).

„ (sec. 330, 1907).

Qualifications of candidates for municipal employment (sec. 68 (1), 1908 and 1909).

Slaughter-houses, Municipal (sec. 559 (34), 1903).

Squares, Public (sec. 559 (52), 1907).

Theatres, etc. (sec. 559 (52), 1908).

Tramways (Regulations, 1904 and 1908; and Rules, 1904, 1908—framed under Act I. of 1880).

Vaccination (sec. 15 of Act V. of 1880, 1912).

Water Supply (sec. 559 (4, 5, 8, 1903).

N.B.—The Bye-laws, Rules and Regulations framed under Act III. of 1899, the more important schedules of the Act, and the miscellaneous rules and regulations which do not derive their authority from the Act but are nevertheless administered by the Corporation, will be found in the useful Handbook compiled for the Corporation by the Central Record Keeper. The service rules—viz. those relating to Leave, Pension, etc.—are published in a ‘Supplement to the Handbook.’

APPENDIX III

(See Index for ‘Hastings’)

Hastings was formerly a part of the Maidan; coolies and other employees of the military authorities at the Fort were permitted to occupy it, and a small town gradually grew up, which was administered by the Commissioner of Police. Under Act V. of 1868, and with effect from 1st July of that year, the whole area, bounded on the north by Clyde Road, on the south by Tolly’s Nullah, on the west by Strand Road, and on the east by the road from Kidderpore Bridge to Clyde Row, was brought within the jurisdiction of the Justices of the Peace for the town of Calcutta.

It was arranged that the police and conservancy charges up to the 1st November 1868 should be borne by the Commissioner of Police, from the Police Fund and the ground

rents respectively. It may be mentioned that the collection of these rents had been transferred to the Collector of Calcutta by Act XXIII. of 1850.

During the negotiations of 1868 some informal arrangement was apparently made between H.H. the Lieutenant-Governor and the Chairman of the Corporation, to the effect that any expenditure on conservancy and police in excess of the ground rent—up to a limit of Rs5000—would be recouped to the Municipality by Government.

In December 1871 the excess amounted to Rs5652. Government, while consenting to make good this deficit, declined to renew their engagement, but agreed to transfer the ground rents of Hastings to the Municipality, on condition that all charges for Hastings should be borne by the latter body. This arrangement, which was to be terminable at the pleasure of Government, is still in force. Hastings now comprises many substantial masonry buildings constructed by private persons, who occupy the land nominally as mere tenants-at-will under Government.

Building operations are controlled or regulated by the Fort authorities, who may, under Act III. of 1899, move the Chairman of the Corporation to take legal proceedings against persons building, or adding to existing buildings, without proper sanction.

It has been the practice—from military considerations—to restrict all buildings to a single storey. The ground rents levied by Government are light. The owner's share of rates is recovered from the owner of each building by the Municipality.

In 1874 steps were taken to extend the filtered-water supply to Hastings. The scheme, costing Rs14,000, was financed from the general water loan granted by Government to the Municipality.

In 1887 it was decided to take action, under section 281 of Act IV. of 1876, to improve the sanitary conditions of the bustee area in Hastings. The scheme, as modified in 1893, was estimated to cost Rs30,575. Government agreed to finance the project on condition that its outlay should be recouped in fifteen years, with interest at 4 per cent. per annum, by an enhancement of the ground rent; Government was also to retain the benefit of the increased rental which the property would continue to yield.

The improvements, which included the opening out of

roads and the extension of unfiltered water (for flushing purposes) and filtered water to the bustee, were completed in 1897.¹

APPENDIX IV

Municipal Disinfecting Station.—The station is located at 149 Lower Circular Road, where the Rat Incinerator is also housed. An 'Equifex' disinfecter is placed in the partition wall of a two-roomed building; infected clothes are placed inside the chamber of the disinfecter in one room, and after treatment are withdrawn from the machine at its opening into the second room. The premises remain open from 8 A.M. to 5 P.M., except on Sundays.

The Superintendent, who is in charge of the institution, including the engine, has a staff consisting of a fireman, durwan, and mehtar. The total annual cost of upkeep is Rs800 to Rs900.

¹ I am indebted for the substance of this note to Babu S. K. Bose, Central Record Keeper to the Calcutta Corporation.



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ff. means 'and following pages.'

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CITY OF CALCUTTA

Scale of Feet
 0 100 200 300 400 500 600 700 800 900 1000
 FEET 100 328 0 1000 1600 MET.

REFERENCES

- Central Municipal Office. [Symbol]
- Districts. [Symbol]
- Ward Office Engineers [Symbol]
- Water works [Symbol]
- Vaccination Station and [Symbol]
- Birth Registration Office [Symbol]
- Municipal Markets [Symbol]
- Disinfecting Station [Symbol]
- Town Hall [Symbol]
- Pipe Depot [Symbol]
- Filtered water pumping station [Symbol]
- Unfiltered [Symbol]
- Drainage [Symbol]
- Ward Boundaries [Symbol]
- District No. 1 Containing wards [Symbol]
- District No. 2 [Symbol]
- District No. 3 [Symbol]
- District No. 4 [Symbol]
- District No. 5 [Symbol]
- District No. 6 [Symbol]
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